

AUTOMOTIVE INDUSTRIES

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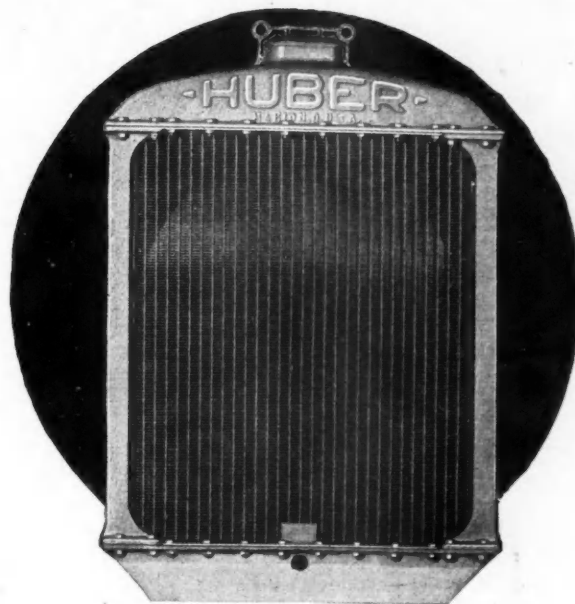
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Automotive Industries

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YOUNG RADIATORS ARE USED WHERE THE GOING IS TOUGH

October 11, 1930

CONSIDER —

*timing gears
as they are to-day*

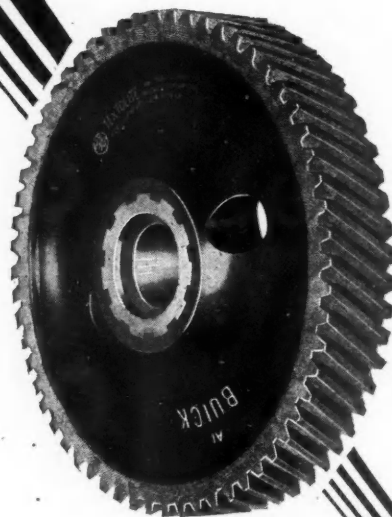
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October 11, 1930

Automotive Industries

AUTOMOTIVE INDUSTRIES

VOLUME 63 OCTOBER 11, 1930 NUMBER 15



INDUSTRIAL buying in appreciable quantities has begun.

Companies and corporations whose names typify American industry have begun to purchase materials and commodities for use and for future requirements.

Carefully, cautiously, yet steadily, more than one giant industry is beginning to build up its depleted inventories at the lowest prices available in years.

A few scattering public announce-

Quantity Buying to Fill Definite Needs Lifts Lagging Trade

General conviction evident that funds could be invested in worse fields than in materials at present levels for future use + + + +

By Norman G. Shidle

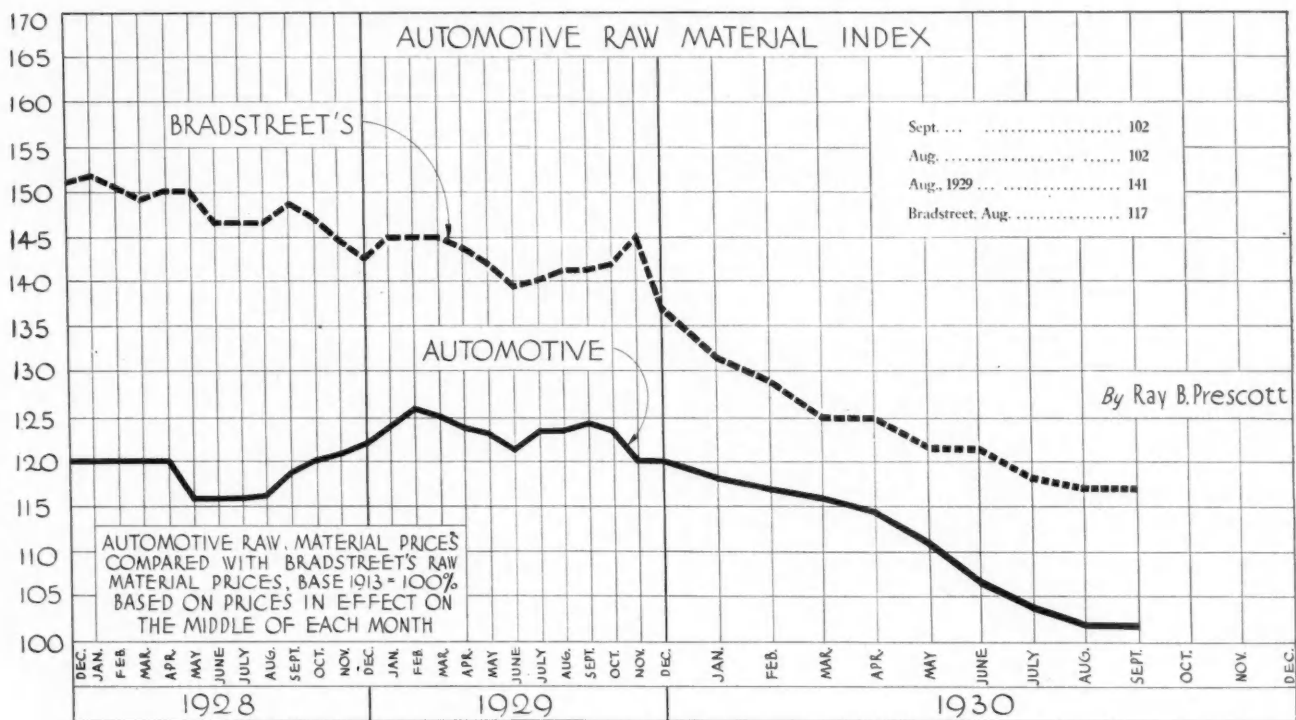
ments of big orders have found their way into the newspapers. There has been a general tendency among business men to discount the significance of these publicized purchases, because of a skepticism these days about false prosperity alarms. Cynics have even pointed to them as moves in the political chess game which is to be decided next month.

But clear evidences of conservatively planned buying programs by a number of extremely big industrial corporations emerge when one digs below the surface and listens to fact and opinion, confidentially expressed, by men high in the current councils of American industry. At least one big factory equipment order reported in the newspapers actually is larger than indicated by the published statements.

Make no mistake—no evidence whatever exists of any violent surge of buying. Far from it. Such purchases as are being made are selective and conservative, definitely keyed to fill specific future needs and to take best advantage of the low commodity price levels now available in specific goods and materials.

The importance of such buying as is beginning to go forward lies not so much in its volume or in its speed as in the character of the companies which are doing it and the

Raw Material's Index Steady



The first definite check since December, 1929, in the automotive index and the second this year in Bradstreet's, is noticeable in the curve for September

business judgment therein disclosed. There is significance, too, in the fact that fellow industrialists—equal in importance to those already cautiously entering the market for bargains—seem to be veering strongly to the belief that buying time is here for those with depleted inventories, surplus funds and perspicacious purchasing agents.

Detailed factual data about current buying activities are difficult to get at the moment; quotations on the subject for publication by industry's leaders practically impossible. Yet a week's prowling in and about some of the inner sanctums of the industrial and business great has yielded enough direct information to render possible the statements made in the foregoing paragraphs.

Stirrings of Life

Even in the factory equipment and machine tool field, stirrings of life are being manifested, automotive markets being mentioned prominently despite the continuance of vehicle production at relatively low ebb. Returning from a swing through automotive territory just the other day, for example, one close observer says:

"I must state that things look considerably improved, though I don't find any chance of a startling production increase this fall. While there won't be

any more expansion in the automotive industry for a long while to come, there is already a very significant factor of obsolescence in machine tools and in methods as well that will cause sufficient turnover of equipment to make a good stable market for tools and factory equipment when automotive business actually picks up."

And ordinary economic logic leads one almost in-

Next Week—

Automotive Industries' annual Production and Factory Equipment Issue will be in your hands

The staff has developed the most important issue of 1930 for you

It ably covers some of the more important phases of engineering and management problems of manufacturing motor vehicles + + + + +

evitably to the same conclusions as those reached through conversations with business leaders.

Many commodity prices are at the lowest levels they ever have reached. Prices which looked like bargains during the depression year of 1921 today would seem like the promised land were they available now to harassed raw material producers in some lines.

Many commodities can be purchased today for less than their cost of production—even when that cost is figured on a current basis.

The general feeling among practical executives seems to be that, if careful analysis of a company's individual situation warrants it, buying time is here even though no guarantees are available that some commodities levels will not sink even further.

Investment Point Here

No one can be found who will state any positive conviction that the bottom absolutely has been reached either in stock market prices or commodity levels. But a very general conviction is evidenced that a company with funds available can easily do worse than to invest some of them in materials for future construction at present levels, since no one can hope to catch the tide of every purchase exactly at its low point.

Another conviction which seems to be emerging among American business men as a result of the continued nose dive of all sorts of commodity prices is that attempts at artificial price stimulation are usually failures and often definitely injurious to the normal course of competitive business procedure.

Artificial Price Evil

One has but to run back over the history of some of those commodities which have been most subject to governmental or other artificial price stimulation to envision some of the facts which have been leading certain business men to this conclusion. Sugar, subjected to governmental restriction by Cuba in one way or another for many years, now sells for less than it did in 1914 and far less than during the peak price year of 1923. Rubber, government regulated by Great Britain, has nose-dived nearly to eight cents after averaging 15.1 cents in January as against an average of 16.5 cents for the year 1921. Coffee, another governmentally regulated industry, has slid downward in price from 18.3 cents average in January to less than eight cents in September, the latter price being approximately the same as that reached in the depression year, 1921. Silk, production and pricing of which has been subjected to governmental activity in Japan, sells for less than \$3 today as against an average of \$4.63 in January of this year and as against a yearly average of \$6.57 in 1921. Tin, which has had special treatment from the Malay States, has declined materially this year also and now stands near the average price level of 1921.

And so it goes. Commodity prices in general have reached very low levels, regardless of artificial or lack of artificial attempts to maintain them.

And now important American industries again are

President Hoover:

"The whole purpose and ideal of our economic system, which is distinctive of our country, is to increase the standard of living by the adoption and the constantly widening diffusion of invention and discovery amongst the whole of our people.

"Any retreat from our American philosophy of constantly increasing standards of living becomes a retreat into perpetual unemployment and the acceptance of a cesspool of poverty for some large part of our people.

"Our economic system is but an instrument of the social advancement of the American people. It is an instrument by which we add to the security and richness of life of every individual.

"It by no means comprises the whole purpose of life, but it is the foundation upon which can be built the finer things of the spirit. Increase in enrichment must be the objective of the nation, not decrease."

—From his recent address before the convention of the American Bankers' Association.

entering the market in a conservative and selective, but steady manner.

Beneficial Results

The results cannot but help be beneficial indirectly to the automotive industry. Some automotive companies themselves are beginning purchasing and thus are profiting by the low material prices. As a result a company may be able to make more profit in 1931 with the same volume of business as in 1930, due to the lower average inventory cost from which its production will be built.

But more important than these direct benefits is the certainty that the giant, Industrial Activity, is slowly beginning to stretch himself, to rise from his lethargy, rub his eyes and begin to look about. Even these early stirrings mean a trend toward increased employment, toward increased buying power and—what is most important—toward a revitalizing of the confidence and courage of the average American worker, farmer and buyer.

Practice of Calculating Gear Tooth by Research Committee in Report to

By P. M. Heldt

ONE of the assumptions on which all calculations of gear strength have been based in the past, that the stress in the teeth is directly proportional to the transmitted tooth load, was shown to be far from correct for the case of high-speed gearing in a report made by Prof. Earle Buckingham of Massachusetts Institute of Technology at the fourteenth semi-annual meeting of the American Gear Manufacturers Association, which was held at Niagara Falls, Canada, Sept. 29-Oct. 1. Professor Buckingham has charge of the research work which is being conducted on the Lewis gear-testing machine at M.I.T., and it was upon results obtained in these tests that the conclusion mentioned was based.

By arrangement with the National Machine Tool Builders Association, Albert E. Grover, cost accountant for that association, had been secured for the meeting and was scheduled to talk on the subject of Cost Accounting for Profit in the Gear Industry at the morning session on Tuesday. The afternoon of that day had been left open for sightseeing, but the problems of cost-keeping, estimating and accounting proved to be so involved and of such interest to attending members that the session was resumed in the afternoon, and a very considerable proportion of the attendance spent all day participating in a sort of debate on controversial problems in industrial bookkeeping. The evening session of Tuesday also was devoted to commercial topics, the report of the Commercial Standardization Committee being read and discussed.

A. A. Ross was inaugurated as the new chairman of the General Standardization Committee, having succeeded the first chairman of that committee, B. F. Waterman, when the latter was elected to the presidency at the last annual meeting. One new associate member was elected, John P. Howard of the National-Erie Co. of Erie, Pa. The next meeting will be held at Buffalo in May next, the 7th, 8th and 9th having been selected as tentative dates. Resolutions of sympathy were adopted by the association on the death of one of its members, Frank J. Oakes, of the Link-Belt Co. of Indianapolis.

Reverting to the announcement by Professor Buckingham of a new principle in connection with stresses in gear teeth, this was made in the report of the Research Committee, of which E. W. Miller is chairman. Mr. Miller was present, but since the research work which is being done for the committee is being carried on at Massachusetts Institute of Technology under the direction of Professor Buckingham, the latter reported on the status of the work.

It is now customary to calculate the pitch-line load which a gear is capable of transmitting at operating speeds by an equation of the general form

$$L = A \frac{C}{C + V} S \text{ lb.,}$$

where A is a function of the tooth dimensions; C , a constant; V , the pitchline velocity, and S the maximum safe working stress for the particular gear material. This equation can be transformed to read

$$S = \frac{1}{A} \left(L + L \frac{V}{C} \right)$$

The first item in the parentheses is the direct tooth load or the load under static conditions, while the second item is the so-called increment load which results from shocks received by the teeth due to inaccuracies in their form and spacing. It will be seen that in the equation this item is figured as directly proportional to the direct load, and Professor Buckingham has shown this to be incorrect. The increment load depends upon the inaccuracies in the gears, the speed, the nature of the material, etc., but with the most common materials it is almost independent of the direct load.

Some of the results obtained with the Lewis machine bearing on this subject are charted in Fig. 1. Distances along the vertical axis represent increment loads and distances along the horizontal axis pitchline velocities. The experiments were made on gears of 4-in. pitch diameter with tooth errors of 0.002 in. When

Strength Shown to Be Erroneous Semi-Annual Meeting of A. G. M. A.

Cost accounting for manufacturers subject of extended debate at Niagara Falls gathering

Worm gear carrying capacity studied + +

subjected to a load of 100 lb. on the pitchline, the increment load on the steel gear was 2500 lb. p. sq. in., while when subjected to a load of 1000 lb., the increment load was 3300 lb. p. sq. in., or only about 35 per cent greater. Under the old method of calculation, the increment load would have been figured as 900 per cent greater at the higher load. Therefore, with such comparatively rigid material as steel, the increment load is almost independent of the applied load.

With gears of cast iron, which material has a modulus of rigidity only about half as great as that of steel, the independence of the increment load of the applied load is not so pronounced. Thus a load on the pitchline of 100 lb. resulted in an increment load of about 1050 lb. p. sq. in., while an applied load of 1000 lb. resulted in an increment load of 1800 lb., or about 72 per cent more. Having a lower modulus of rigidity, the cast iron better absorbs the shocks resulting from errors in the teeth, and the increment load is thereby reduced. This is still more evident in the case of gears of phenolic materials, which have a modulus of rigidity of less than 1,000,000. The applied loads, of course, are not affected, but the corresponding increment loads are greatly reduced by the greater elasticity of the material. In a report which Professor Buckingham hopes to complete by the end of the year a method of determining the increment load and the total load under all operating conditions will be given. The increment load, of course, depends upon the speed, the tooth error and upon what may be called the mass conditions, that is, the moments of inertia of the masses whose speeds will vary in direct proportion to those of the gears in mesh as a result of inaccuracies in the teeth.

The principle involved here really has far wider application than to gears alone. Bearings, for instance, are subject to a static load and to an additional increment load which is, to a considerable extent at least, independent of the static load.

Professor Buckingham said that the Research Committee at present had three major projects under consideration, as follows:

First—Tests of helical gears duplicating those which have been carried out on spur gears.

Second—Further tests on non-metallic spur gears with special reference to tooth design with the object of preventing the cutting of the non-metallic gear by the metal gear meshing with it.

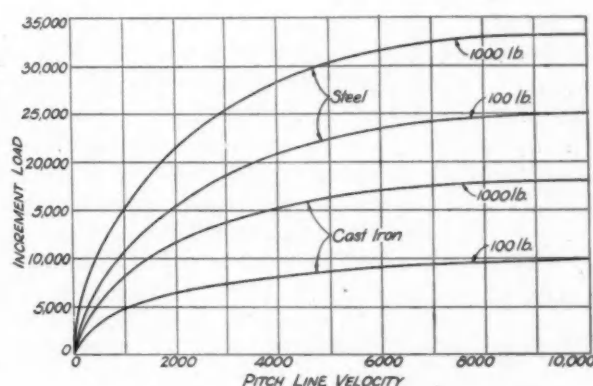


Fig. 1—Relation between increment load and pitchline velocity of gears in Lewis testing machine. (Tooth error, 0.002 in.)

Third—Friction loss tests on both spur and helical gears, to which the Lewis machine lends itself very well.

The Keyway Committee, R. B. Zerfey, chairman, proposed tolerances for interchangeable (not for fitted) keys which were said to be somewhat closer than tolerances for keys proposed by the Sectional Committee on Shafting of the A.S.A. In the discussion, several speakers considered it inadvisable to adopt a tolerance table differing from that of the Sectional Committee on Shafting, even though its tolerances were intended for keyways in cold-rolled shafting, while those of the A.G.M.A. were intended for keyways in turned shafts. The report, therefore, was accepted as a progress report only, to await the reaction of the membership to the proposed tolerances during the next half year.

The Nomenclature Committee had combined the nomenclatures for the different types of gearing, worked out in collaboration with the subcommittees on these types, in a single publication. A blank column was left for symbols for different terms that have to be used in mathematical equations, and these symbols will be supplied by Mr. Candee of the Gleason Works before the next

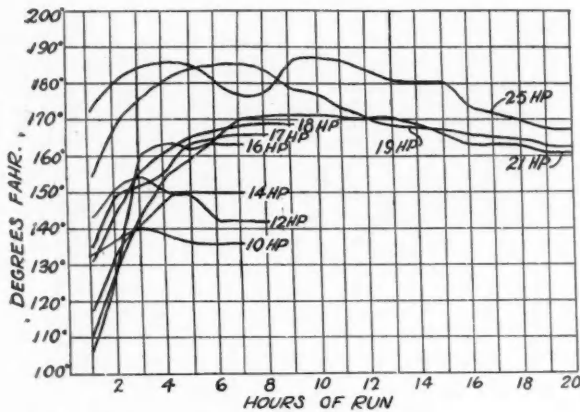


Fig. 2—Curves of temperature of lubricating oil in housing of worm-gear unit under different loads, reduced to a uniform room temperature of 77 deg. Fahr.

meeting. These symbols will be printed in the dictionary of gear terms alongside of abbreviations for the same quantities, which latter are handier to use in correspondence and in the preparation of specifications, since they can be more readily handled on the typewriter. There was some objection to certain equations defining such terms as addendum, as the addenda used by different manufacturers differ, and it was decided to substitute the word "constant" for the actual value and also to make it clear that these equations were intended only to help convey the meaning of the term and not for use by designers. This report, which was presented by D. T. Hamilton, chairman, also was adopted as a progress report, and it is hoped to make the several alterations required by next spring and definitely adopt the proposed nomenclature at that time.

Non-Metallic Gearing Practice

H. R. Moyer, chairman, presented the report of the Committee on Non-Metallic Gearing. This committee had added to its Recommended Practice a table of the Lewis y factor applicable to gears with 20-deg. pressure angle. The same factors apply to both full-depth and stub teeth. The older Recommended Practice contains a table of safe working stresses for phenolic materials and rawhide at different speeds, and Professor Buckingham said tests made on gears of three different materials had shown that the actual loads follow the curve of the equation from which the table was computed as closely as could be expected.

A progress report of the Worm Gear Committee was made by W. H. Himes, chairman. This committee some years ago worked out a series of formulae for the calculation of worm gears, and these formulae have been in practical use by a number of companies since and have been found to accord well with practice. Mr. Himes explained that while there had been some criticism of the committee's work, such standardization as it was aiming at would make it possible to produce hobs in quantities for stock and thus reduce their cost, and to the gear manufacturer it offered the advantage that whenever he ordered a hob, he might expect immediate delivery from stock, instead of having to wait for it possibly for weeks.

What is needed most is a suitable formula for the load capacity of worm and gear combinations of given dimensions. This requires that tests be made of the limiting loads for various combinations, and Mr. Himes described some tests (Fig. 2) that have been carried out by him at the Westinghouse Electric & Manufacturing Co. Two worm and wheel combinations were built, and tests were run on them. Other member companies, Mr. Himes said, had offered to run similar tests. The two sets were connected in tandem, the drive in the first being from the worm to the wheel, and that in the second in the opposite direction. Both worms had four threads of 0.75 in. linear pitch and 3-in. lead; their helix angle was very slightly over 21 deg. and the pitch diameter 2.483 in. Worms were of forged steel, case-hardened and ground. Wheels were made of a gear bronze similar to S.A.E. Specification No. 65 on cast-iron centers. The wheel in the driving unit had 57 teeth and the other one 56, the reason for making them different being that it was desired to study any possible effects of a so-called hunting tooth. All shafts were supported in Timken taper roller bearings, mounted in housings built up of $\frac{3}{8}$ -in. steel plates electrically welded. One and a half gallon of 600 W cylinder stock oil was put into each housing, the oil rising to such a level that the teeth of the under-mounted worms dipped into it to a depth of $\frac{1}{2}$ in. This double unit was driven by means of an electric motor and from the worm of the driven unit power was taken off by belt to drive an electric generator.

Load Capacity of Worm Gears

According to one standard handbook, the worm and gear combination described should have a capacity at the speed at which the test was run (1170 r.p.m. of the driving motor) of 15 hp., and according to another, of 2 $\frac{2}{3}$ hp. In making the test, a start was made with 10 hp. and after each run the load was increased by 1 hp. The temperature of the oil was measured at a point where it emerges from between the teeth of the worm and the gear, and each run was continued for some time after the temperature curve had leveled off. One peculiar feature of these measurements was that the temperature did not rise continuously to the final value, but reached a peak value and then dropped again, as shown by the curves reproduced herewith. This occurred during every run, and the phenomenon has not yet been fully explained. Professor Buckingham has suggested it may be due to cramping of the taper roller bearings as the worm heats up, which cramping may be relieved later on when the case reaches its highest temperature. It should be explained that the units were lapped in and adjusted to obtain a bearing over the full width of the wheel teeth during the early part of the test.

The load was increased in uniform steps up to 21 hp., at which load the units were run continuously for 32 hours without signs of distress. It was then increased to 25 hp. and the units run continuously for 28 hours. Measurements with a Brown & Sharpe gear tooth micrometer showed no change in tooth thickness since the previous check and no new pitting. The tests are to be continued.

Prof. V. O. Homerberg of M.I.T. spoke on Nitro-Alloy Steels, which he said were introduced in this country about three years ago. The nitriding process permitted of giving steels a harder surface than had ever been obtainable before, of from 1200 to 1400 equivalent Brinell, and what was more, the steels retained their hardness at high temperatures and also were rust-resistant to a considerable degree.

The subjects of nitro-alloys and nitriding were very systematically studied by Dr. Fry of the Krupp Co. of Essen, Germany. Dr. Fry started out by determining what particular alloying elements would best combine with nitrogen at a temperature of 950 deg. Fahr. He found that aluminum ranked first, as regards both the amount of nitrogen taken up and the stability of the resulting aluminum nitrides. Plain carbon steels and various alloy steels, including steels containing aluminum, and aluminum together with other alloying elements, such as chromium and molybdenum, were subjected to the action of ammonia gas under definite conditions, and the resulting surface hardness was determined in each instance. The outcome of this investigation by Dr. Fry was the marketing of a series of alloy steels containing varying amounts of carbon together with 1-1.25 per cent of aluminum, 1.5 per cent chromium and 0.2 per cent molybdenum.

Containers for Nitriding

The containers in which parts are nitrided present quite a problem, and a number of different materials have been used for them, including plain carbon steel, steel containing 18 per cent chromium and 8 per cent nickel, nickel and monel metal. At the present time the most satisfactory results are obtained with steel having a coating of enamel on the inner side. The search for better materials for these containers is still being continued. Suitable gaskets are used between the containers and their covers to prevent the entrance of air.

During the process the ammonia which is being passed through the container is broken up into hydrogen and nitrogen, and both of these gases are in a very active state. Ordinary ammonia gas might be passed over the heated parts to any amount without producing a noticeable effect. At 975 deg. Fahr. the ammonia is broken down to the extent of about 30 per cent. If the temperature is increased, the depth of case is increased, but more hydrogen is liberated, and hydrogen is an active decarburizer. Moreover, the higher the operating temperature, the greater the distortion of the work.

Recently numerous new furnaces have been developed for nitriding. Leeds & Northrup have adapted their Homo furnace for this purpose. Some of the newer furnaces, including those developed by the Westinghouse Co. and the Surface Combustion Co., work on the continuous principle, to reduce the cost of the operation. It now costs from 9 to 15 cents a pound to nitride steel articles, about 4 cents a pound more than to case-harden them, which is due mainly to the length of time required for nitriding. Attempts are now being made to cut down this time, and considerable success has been attained already. Where for-

Gear Research Has Wide Application

A principle discovered in the research work on gear tooth stresses being carried out by Professor Buckingham for the A.G.M.A. has a wider application than to gears alone

Bearings, for instance, are subject to static load and to an additional increment load which is to some extent independent of the static load + + + + +

merly parts were nitrided for 90 hours, the process now is often completed in 48 hours and less. One method of expediting the work is to nitride in two stages at two different temperatures, but Dr. Homerberg said he did not favor such a two-stage process, as he did not think it gave any better results than operating at 975 deg. throughout.

Steel that is to be nitrided must always be thoroughly annealed or heat-treated previously. If this is not done, and the steel should have been finished at a rather high temperature and be coarse-grained in consequence, when it is subjected to the action of the ammonia a very brittle structure results—so brittle in some instances that the case can be scraped off with the nail of the thumb.

Friction and Wear Characteristics

Dr. Homerberg described extensive experiments carried out at M.I.T. to determine the friction coefficients of nitro-alloys in conjunction with various other metals when run together dry. The bearing surfaces of the experimental apparatus had an area of 2 sq. in. and a load of 14 lb. was applied to them. With nitro-alloy against nitro-alloy there was no scoring, neither was there with nitro-alloy against cast iron. Best results were obtained with nitro-alloy against a bronze containing 80.2 per cent copper, 11.5 per cent tin, 5.5 per cent nickel, 2.8 per cent zinc and a trace of lead. With this combination the coefficient of friction was only 0.095. More weight was seemingly lost by the nitro-alloy than by the bronze, but this result may have been due to some of the metal dust worn off the nitro-alloy becoming embedded in the bronze.

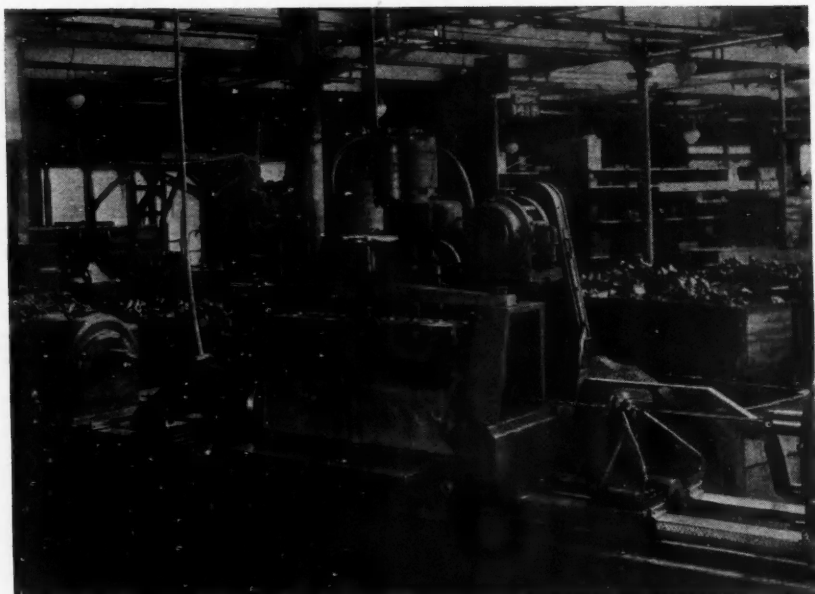
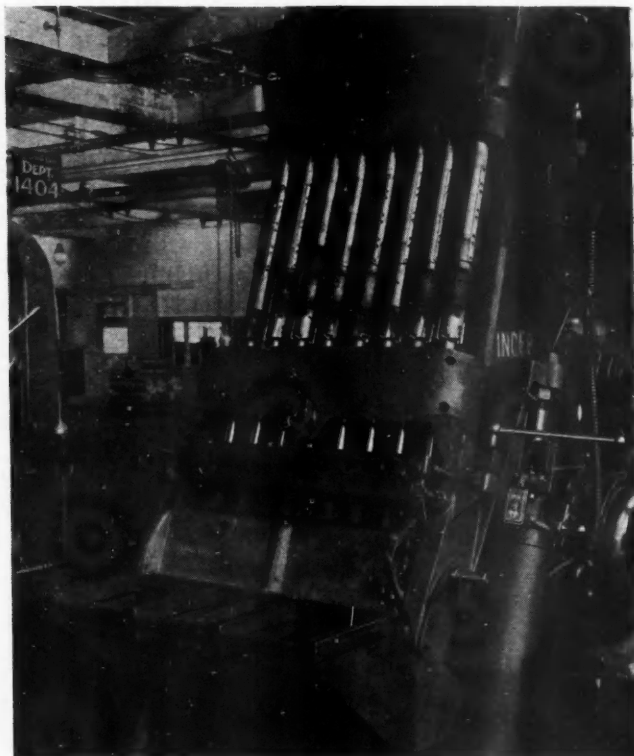
Some figures on the relative wear of cast-iron and nitrided-steel engine cylinders were quoted from a communication by Dr. Leon Guillet to the French Academy of Sciences. After 18,630 miles of service the wear of the bore of the cast-iron cylinder was 0.018 in., while that of a nitrided cylinder was only 0.0008 in. In an aircraft engine after 100 hours' operation the wear of cylinders of heat-treated steel was 0.0032-0.004 in., while that of the nitrided cylinder was too small to be measured. In another case the oil consumption of an engine with heat-treated steel cylinders multiplied three-fold in 100 hours, that of an engine with nitrided cylinders remained unchanged.

Rigid Production Economies Attained

Modern tools, recently installed, are free from vibration, entirely automatic wherever necessary, and electrically controlled by simple push-button accessories + + + + +

Fig. 1—Massiveness, simplicity and accuracy are notable in the eight-spindle boring machine used in building the Reo Eight + + + + +

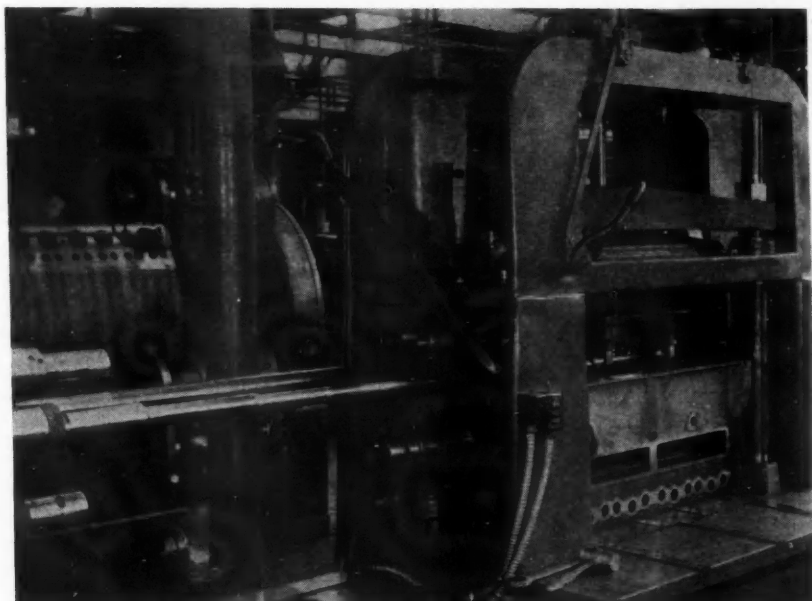
Fig. 2—Hardened and ground ways for sliding heads and intermediate bearings supporting ends of the slender drills feature this fixture for horizontal drilling of the crankcase in the Reo + + +



A MASSIVE, three-way drilling machine with 139 spindles for the bottom, left and manifold sides of the cylinder block; another three-way drilling machine with 96 spindles for the top, rear and front faces, as well as two companion, three-way tapping machines with 114 and 65 spindles respectively are representative of the modern machine tools recently installed at the Reo Motor Car Co. to build the new Reo Eight, which was described in *Automotive Industries*, Sept. 27, 1930.

The introduction of the Royale Eight with its advanced standards of performance; with its rigid requirements for manufacturing precision coupled with better production economies, demanded mod-

in Building Reo Royale Eight



By Joseph Geschelin

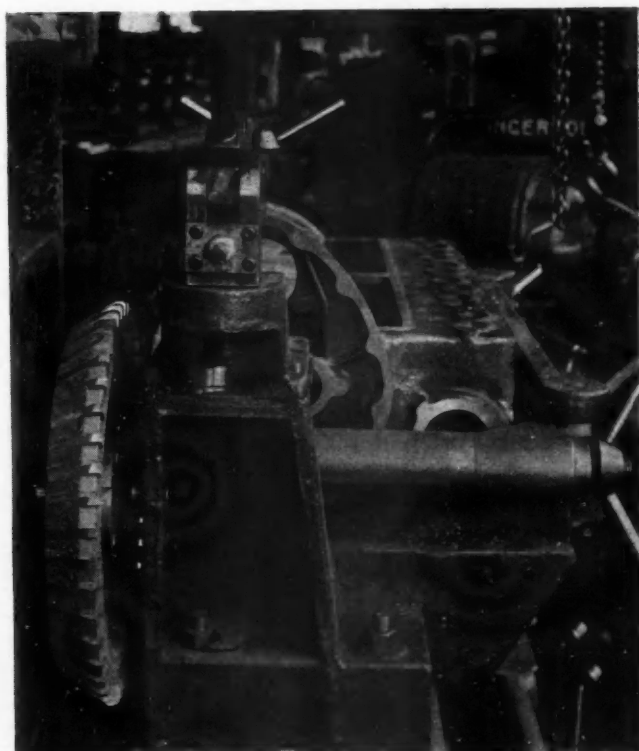
Fig. 3—This horizontal boring mill has an arrangement for lifting the block into place hydraulically +

Fig. 4—Milling the bottom face of the Reo block + + + +

ern tools of adequate precision and productivity, and amply justified the outlay for this equipment. These new machines, some of which will be described more in detail later, are rugged, free from vibration, entirely automatic wherever necessary and all electrically controlled by simple push-button accessories. Rigid, accurate control of each operation is provided by the simple, carefully designed fixtures with which each machine is equipped, a striking thing about these fixtures being the facility with which work may be loaded and unloaded. To further insure accuracy each fixture has special indexing points matching with locating points on the castings which give an accurate control from operation to operation.

Cylinder blocks are moved along on a roller conveyor which links the machines in this department. An interesting feature of the roller conveyor is the provision of special turntables at various points for reversing the ends of the block and turning over from top to bottom where necessary. Another unique arrangement, which will be described later, is employed to free the block of oil and chips prior to the final inspection.

Modernity is evident at every turn in the production routings, methods, and the use of special unit machines. Some of these deserve special mention. Representative of one group of these is the special machine consisting of a base with a number of standard heads fitted to it. One or two of these will be described as we go along. More ingenuity is shown in the attachment of



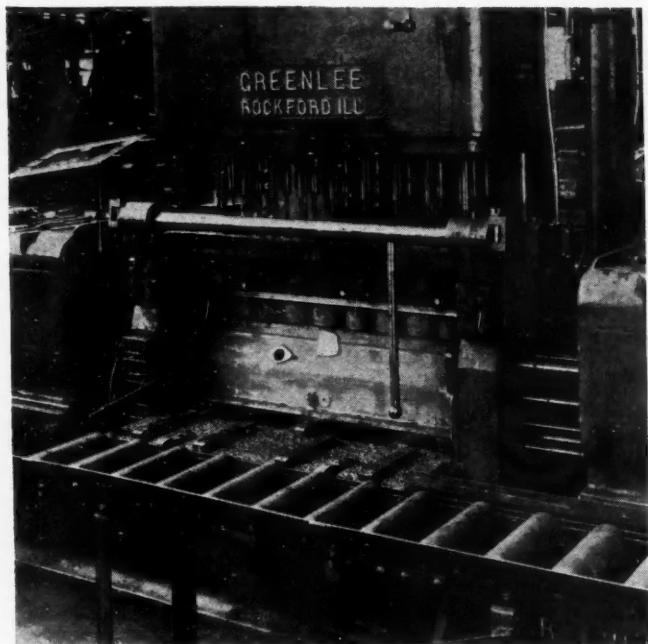
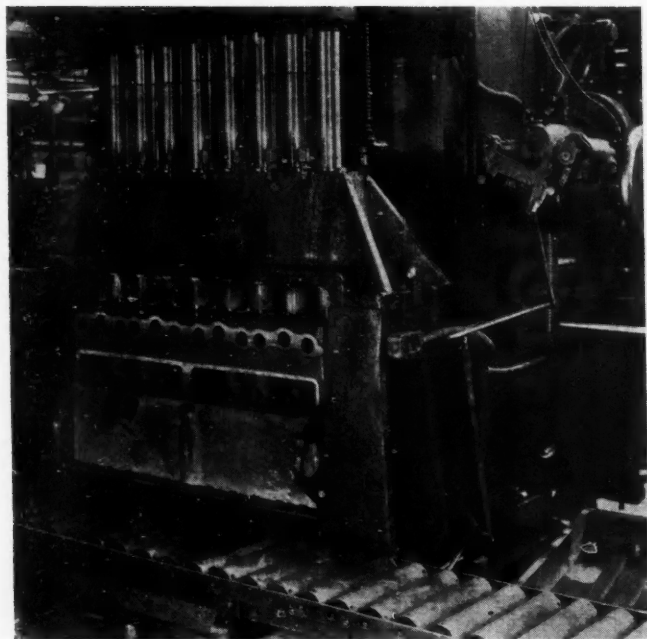


Fig. 5—Semi-finish boring operation on an eight-spindle machine + + + + +

Fig. 6—Top, front and back ends of the block are completely drilled on a 96-spindle three-way milling machine + + + + +

Fig. 7—Trunnion-type fixture, with an integral nine-spindle drill, where nine oil holes are drilled in crankshaft bearings + + + + +

Fig. 8—Drilling, counterboring and tapping for tappet guide studs in this unit is an example of one of a number of special tools with standard head attachments

drilling and tapping heads on standard milling machines and machines of other types. An example of this is a milling attachment on a W. F. & John Barnes horizontal boring machine. Another is the attachment of drilling heads on a standard knee type miller.

Considerable flexibility as well as economy is achieved by the use of a number of high frequency drills for countersinking and for assembling bearing caps and studs. And, finally, there is a repair station designed to handle with facility all drill and tap repair operations.

Now let us follow the course of the chrome nickel cylinder-block from operation to operation in the engine department. The block is first cleaned and the interior sprayed with lacquer as a protective coating. In the initial machining operation the top and bottom surfaces of the block as well as the bearing seat are milled on a special Ingersoll milling machine with five cutter spindles; 0.025 in. is left on all surfaces for finish. Probably the most important preparatory operation is at the next station, where two $\frac{3}{4}$ -in. holes are drilled and reamed in the bottom flange for locating on subsequent operations.

Using the locating points in the preceding operations, the front end water-pump pad and rear end are milled to size on a six spindle, drum-type Ingersoll milling machine. Rough

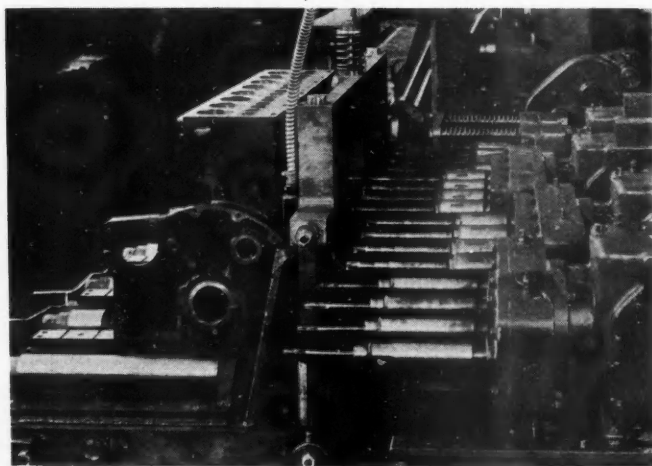
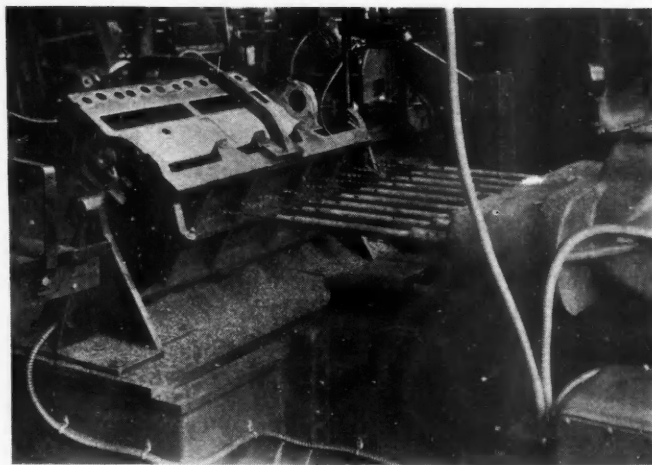


Fig. 9—An inspection station in the Reo engine line, where (upper view) the block is reversed in direction

The cylinder block in a hook fixture (lower) used by inspectors, lifted and turned on its side to drain cutting lubricant and chips + + + + +

Fig. 10—Final honing of the block (below), with a view of the machine used and a close-up of the hone and fixture + + + + +

boring of the cylinders is accomplished on an 8-spindle cylinder-boring machine, Fig. 1. The massiveness as well as the simplicity of the fixture is well worth noting, as the accuracy and alignment of the cylinder bores are largely dependent upon the alignment of the boring bars. This operation is held within 3.330 in. to 3.285 in., providing a tolerance of 0.045 in. for roughing.

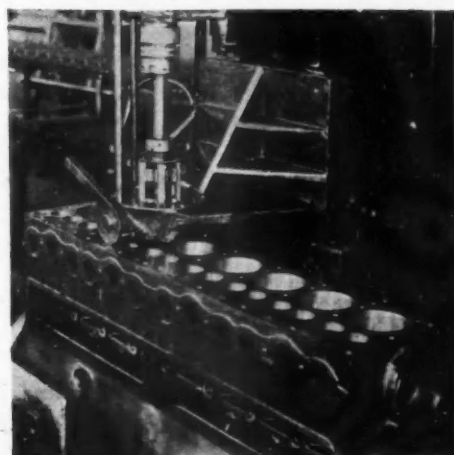
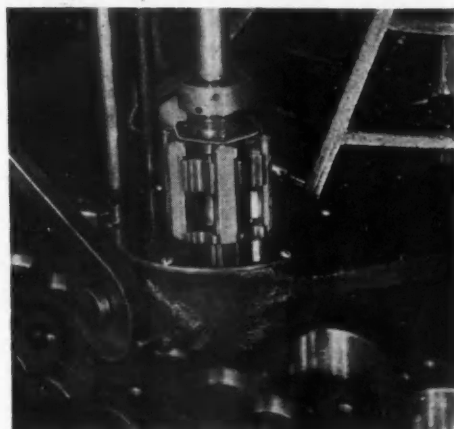
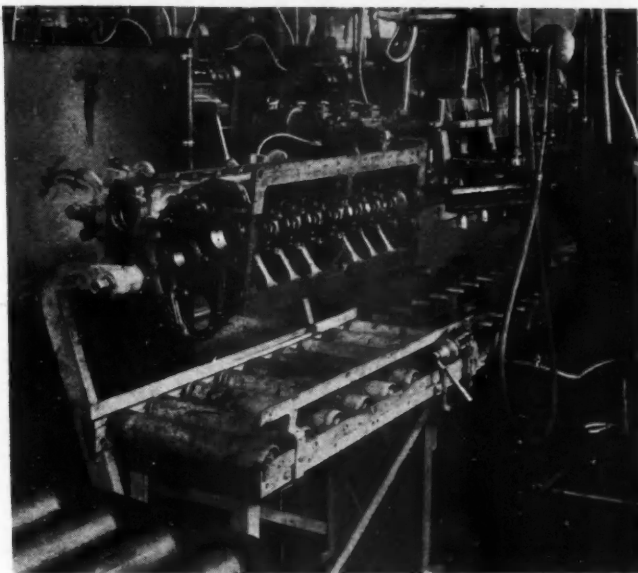
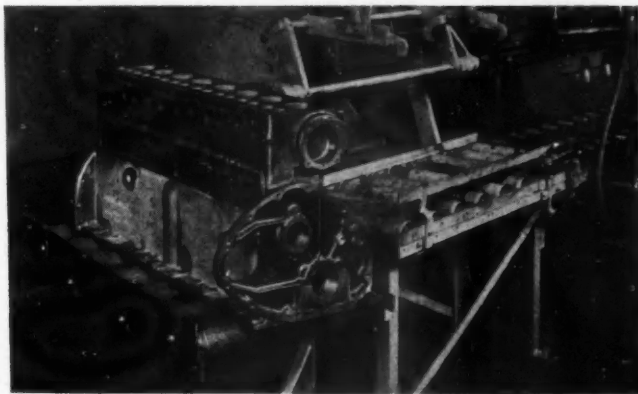
The horizontal drilling of the long oil supply hole in the crankcase is of sufficiently recent origin to warrant discussion. Fig. 2 shows a No. 310 W. F. & John Barnes horizontal drilling machine drilling the oil supply hole in the crankcase from both ends. Note the hardened and ground ways for the sliding heads and the intermediate bearing at each end to support the long, slender drills. In the background will be seen the special attachments on this machine for milling the small bosses on the other side of the block.

Passing over several of the intermediate operations we reach the first boring operation on the crank and cam bearings and bores for the water pump and starting motors. In Fig. 3 is shown a No. 430 W. F. & John Barnes horizontal boring mill provided with a distinctive fixture having an arrangement for lifting the block into place hydraulically. Observe that the block is upside-down, its position having been reversed on one of the turntables in the conveyor. Another feature of this boring mill is an exceptionally long bed which permits the driving head to retract the boring bars completely.

Milling the bottom face is accomplished on a Milwaukee-mil, Fig. 4, using a 16-in. left-hand face cutter. The bearing cap seats are now finish-milled on the 3-spindle Ingersoll open side miller, and proceed to the semi-finish boring operation, Fig. 5, on an 8-spindle, No. 10D Moline boring machine. Here the bores are held to 3.339 in.-3.332 in.

Top, front, and back ends of the cylinder block are completely drilled on the 96-spindle, three-way Greenlee milling machine, Fig. 6. Next the head stud holes are countersunk by means of a high frequency drill and the block passes to a 65-spindle Greenlee, three-way tapping machine which taps in the top, front and back faces where required.

Leaving the Moline 16-spindle driller shown at the right in Fig. 7, the block enters the trunnion type fixture built in as an integral part of a special 9-spindle W. F. & John Barnes horizontal drilling machine. At this station nine



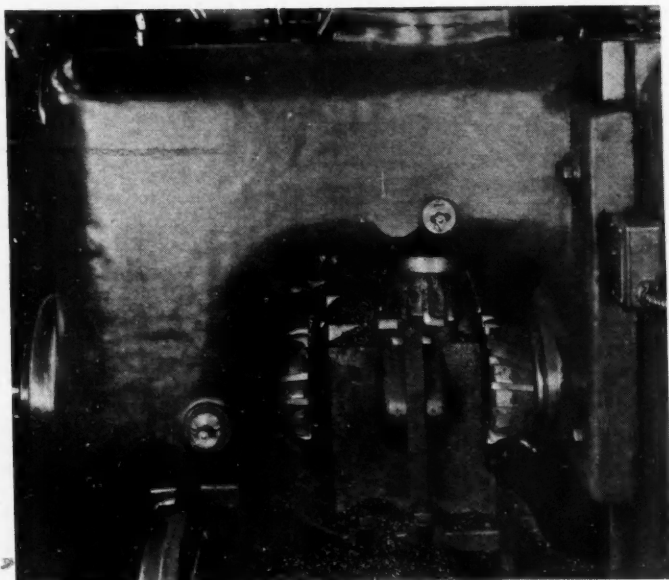


Fig. 11—Intake and exhaust manifolds are sand-blasted, enameled and baked and then face-milled in this fixture

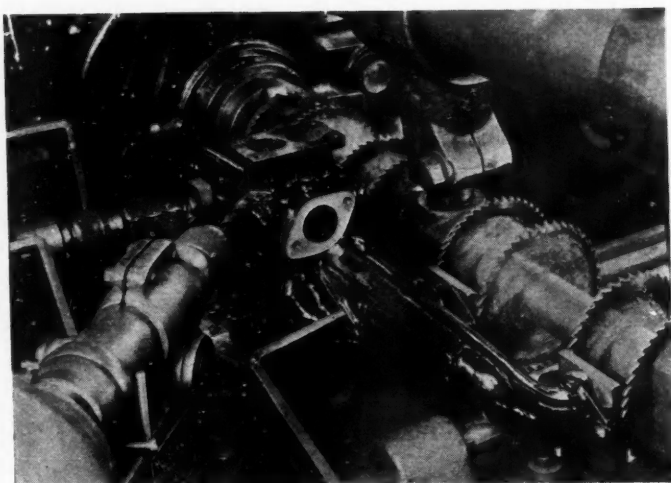


Fig. 12—An unusually interesting fixture in which the manifolds are drilled and the ends of the cylinder-block flanges are sawed off + + + + +

11/32-in. oil holes are drilled in the crankshaft bearings to the main oil line. Further down on the line the block is reversed and enters the Ingersoll three-way drilling machine which drills 139 holes in the bottom face, left-hand side and manifold side. The crank bearing stud holes are countersunk with a high frequency drill mounted on a sliding radial arm. Then the blocks enter an Ingersoll three-way tapping machine which taps 114 holes in the bottom face, left side and manifold side.

Next in line are a number of special drilling and tapping machines consisting of specially designed bases with standard drilling-head attachments. An

example of one of the larger units is the machine shown in Fig. 8 consisting of four 2 hp. Corwin units, each with four spindles, for drilling, counterboring and tapping for tappet guide studs.

Near the end of the line we find a single spindle Hammond sensitive radial drill employed for repairing drill holes where necessary. Finally, the piston bores are finish-reamed on a single spindle L & G drilling machine and pass to the inspection station where the cylinder bores and bearings are checked. Fig. 9 shows two views of a turntable near this station; one view shows the block being reversed in direction and a detail of the special hook-fixture used by the inspector; the other shows a cylinder block in this fixture, lifted and turned on its side to drain cutting lubricant and chips.

Fig. 10 shows the final honing operation with a view of the Barnes honing machine and a close-up of the hone and fixture. Use of this fixture as a bearing for the hone at the mouth of the cylinder as well as to provide the clamping arrangement probably has a good deal to do with the success of the operation. The question will probably occur as to why a single, spindle finish-reaming, and a single spindle honing machine are used. We asked the question and found that the reason was largely one of economy since a single spindle machine on these operations provides all the excess capacity they require. An eight-spindle machine would handle the job just as satisfactorily so far as accuracy is concerned but it would have altogether too much excess capacity for their finishing operations. Consequently, in addition to the added investment, the larger machines would be uneconomical on this set-up because they could be operated only at short intervals during the day.

After honing, the top face is finish-milled, valve stem guides are pressed in by means of a 35-ton oil gear press, and the finished block is delivered to the motor assembly line.

Before leaving the cylinder block department it might be well to note that wherever possible the odd, single, drilling and milling operations have been segregated and are accomplished on individual setups rather than combined with any of the major operations. Examples of this are the operations of milling the oil filter and breather pads on a Cincinnati plain automatic miller; and a setup on an Ingersoll for milling pads on both sides for the water jacket tappet cover plate and manifold. Another interesting operation is that of milling the rear crank bearing to length and spot facing for the final inspection gage. This is accomplished on a Cincinnati special eccentric head milling machine equipped with a mounting bracket and a No. 1 Avey drilling unit.

After leaving the cylinder block department the next point of interest is the machining of intake and exhaust manifolds. The first four operations for both the intake and exhaust manifold castings are practically identical. The castings are sand blasted,

sprayed with enamel, enamel baked and have the faces milled on a No. 3 Sundstrand rigid-mil with a special 3-spindle head, a close-up view of which is shown in Fig. 11.

The intake manifold then proceeds to a 17-in. Reed-Prentice lathe, equipped with an eight-spindle drilling head for drilling eight, 15/32-in. holes in the cylinder block face. An unusually interesting setup will be found in Fig. 12 showing a combination milling and drilling job on the intake manifold. The machine is a standard No. 4 Hendy Norton knee-type milling machine with eight 6-in. saws for cutting off the ends of the cylinder block flanges. In the foreground, which is the back end of the machine, are shown the two Avey drilling units for drilling miscellaneous holes.

On the exhaust manifold the fifth operation is that of milling the intake manifold face on a No. 3 Cincinnati vertical milling machine. Then the manifold goes to a 17-in. Reed-Prentice lathe as in the case of the intake manifold except that this one is provided with a 10-spindle drilling head for drilling ten 15/32-in. stud holes in the cylinder block face. Fig. 13 is a close-up of a No. 13 Brown & Sharpe milling machine, milling the surface for the heater-valve cover plate.

The final operation here is the assembly of the intake manifold, heater tube and heater valve with the exhaust manifold. The equipment used is a special fixture with a base and an Ingersoll-Rand reversible air motor.

Machining operations on the Lo-Ex pistons for the 8-cylinder engine are similar to their usual practice as will be evident from the following routing:

1. Inspection.
2. Center closed end-face and counter bore open end.
3. Rough turn O. D. 3.420-3.425 (2) top ring grooves 3.110-3.115. Third ring groove 2.098-3.102, oil ring groove 3.100-3.105 and oil belt to 3.350-3.360.
4. Drill (10) 5/32 in. smoke holes.
5. Drill (12) 3/32 oil holes.
6. Rough face closed end to 4.003-4.013.
7. Finish bore to 2.977 and counter bore to 3 1/16 in. dia.
8. Finish turn O. D. to 3.385-3.390, and ring grooves to 3.081-3.085 and 3.071-3.074.
9. Rough grind O. D. to 3.377-3.378.
10. Rough grind O. D. on centerless to 3.3725-3.373.
11. Grind taper to 3.348-3.352.
12. Cross bore and ream to .9695-970.
13. Turn lock ring groove to 1 3/64 in. x .078 and chamfer corners of pin hole inside.
14. Finish face closed end to 2.228-2.232.
15. Burr complete.
16. Diamond bore pin hole to 0.9833-0.9838.
17. Wash piston.
18. Finish grind O. D. to 3.369-3.70.
19. Wash and cool piston.
20. 100% inspection.

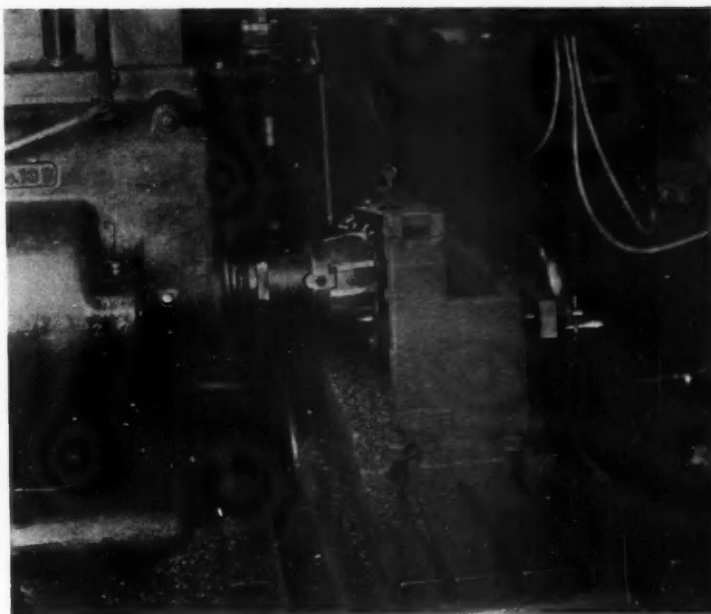


Fig. 13—Using a left-hand face-milling cutter, the surface of the exhaust manifold is milled for the heater-valve cover plate + + + + + + + + +

Nevertheless it is well to note a number of unusual features about their setup. For example, the outside diameter is rough-ground first on the Landis grinder, and then rough-ground again on a Cincinnati centerless grinder which gives it a slight eccentricity, the limits on the operation being 3.3725 in.-3.373 in. Another interesting job is that of Diamond-boring the pin holes on a 2-spindle Coulter boring machine. The tolerance on this operation is 0.0005 in.

As a final operation the outside diameter is finish-ground on another Cincinnati centerless grinder to 3.369 in.-3.370 in., which provides a maximum tolerance of only 0.001 in. The pistons are now washed and cooled and go through to the 100 per cent inspection. In this department, practically all tools are tipped with cemented tungsten carbide, as it is only with this material that Lo-Ex pistons may be properly machined.

Both the camshaft and crankshaft for the Reo Eight are built in this engine plant. In each department they have installed a number of the latest type machine tools to facilitate production. The most interesting features in the camshaft department are the tooling on the Lo-swing lathe which faces the sides of bearings and cams, and the tooling on the Fay automatic which rough-turns the gear blank, bearings, spaces between cams, and the thrust washer bearing.

This brief glimpse of the operations along the new engine assembly line provides a good perspective of the modernity of their layout and the progressiveness shown by the Reo production department in taking advantage of the economies promised by the introduction of modern machine tools with their augmented productivity, ability to maintain closer tolerances, and better quality.

Statistical Method for Automotive Unit

Status of nitriding as a production process reflected in the number of papers presented on this means of hardening to the gathering at Chicago + + + + +

OF the many technical papers presented by the various engineering societies concurrently with the National Metal Exposition, and which augmented the educational and informative value of the exposition itself, those dealing with two phases of development were possibly the most interesting from an automotive standpoint, although it is difficult to make any definite statement as to their relative value due to the wide variety of subjects treated and the close relationship many of them had to one another. At the same time several additional subjects had a particular automotive angle.

Use of Statistical Method

While the so-called "statistical method" of analysis is generally known to engineers, the actual or prac-

tical application of this means of solving various engineering problems has not been extended to anything like the degree it would seem it should. It therefore seems noteworthy that one of the first papers of the meeting utilized the method in the solution of a problem of immediate interest to the engineer and production executive. We are referring to the paper entitled "The Physical Properties of Fine Bolts," by H. B. Pulsifer, metallurgist for the Ferry Cap & Set Screw Co.

In this paper Mr. Pulsifer summarized the results of tests on over 3000 bolts in a series of eleven charts, each chart showing the distribution curves for the yield point, tensile strength, elongation and hardness of one material. The charts therefore indicated the nominal properties to be expected or which can be depended upon the represent those for bolts produced in regular manufacture. Due to the wide "spread" of the distribution curves (see Fig. 1) even though all runs or groups of bolts were made from the same roll of wire, interest was centered around the causes of these variations in properties and the means for overcoming them in commercial practice.

In discussing the paper Mr. Harvey, of Lamson & Sessions, said he thought the deviations shown by Mr. Pulsifer were greater than necessary and felt that the spread could be limited by more uniform heat treatment (in bolts so processed), closer chemical limits and inspection. He then showed charts of tests in which these limits were less. While Mr. Pulsifer thoroughly agreed that improvement could be obtained by these methods, he again emphasized the statistical nature of his tests in that unless the same or a greater number of bolts were tested and the results individually charted, any results obtained could not be in exact agreement.

It was pointed out that Mr. Pulsifer's work should serve as a means of eliminating disagreements between manufacturer and purchaser, since it was shown that more than a chemical or physical specification alone was necessary to establish the quality or strength of the part desired. Additional discussion brought out the point that much more uniform results are obtained when Brinell tests are made on the shank of the bolt rather than on the head and that this test can be considered most practical for production work. It is to be expected that Mr. Pulsifer's paper will serve as a stimulus in the further application of the statistical method to tests on "duplicate" parts in automotive manufacture.

R. E. Peterson, of the Westinghouse Electric &

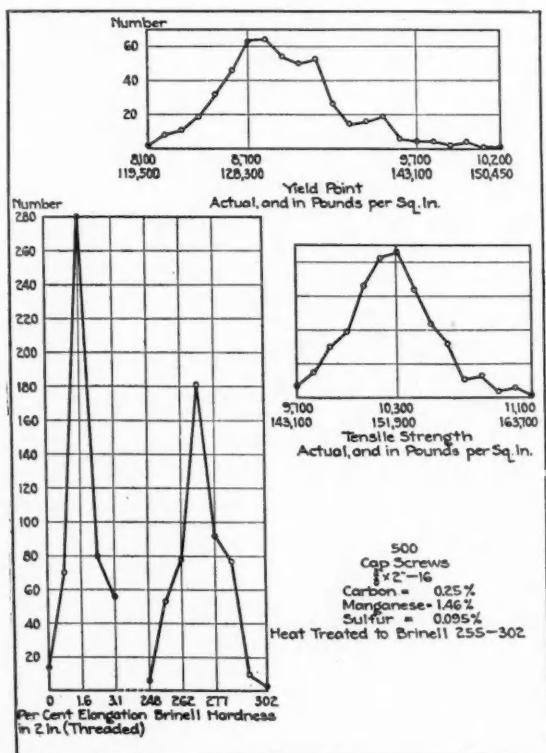


Fig. 1—Physical properties tests on 500 cap screws + + + + +
Typical example of application of statistical method to bolt testing + +

Tests Described Before Metals Congress

By Edmund B. Neil

Director of Research
Chilton Class Journal Co.

National Metal Exposition—

at Chicago, Sept. 22 to 26, was of tremendous value to the industry in its detailed discussions of production and research problems carried on during the past year.

The exposition was sponsored by the American Society for Steel Treating, in conjunction with the Institute of Metals, the Iron and Steel Divisions of the A.I.M.E., the American Welding Society, the Iron and Steel and Machine Shop Practice Divisions of the A.S.M.E. and the International Railroad Master Blacksmiths Association.

Space limitations prevent the publication of the numerous papers, with the active discussion attending their presentation. Mr. Neil has abstracted briefly the phases of interest to the automotive industry, and will present further data derived from special papers in later issues + + + + +

Manufacturing Co. (East Pittsburgh), in his paper "Fatigue Tests of Small Specimens With Particular Reference to Size Effect," showed that for ordinary steels the effect of size is not appreciable up to a 2-in. diameter (Fig. 2). Tests were made with a special fatigue testing machine developed at the Westinghouse laboratories and with other types of machines on specimens ranging from 0.050 to 2.000 in. diameter. The machine has been developed to a point where it may be used for making tests where the amount of material available is small, such as in broken parts, screws, etc., thus reducing the cost of making tests, which, as pointed out by Prof. Moore

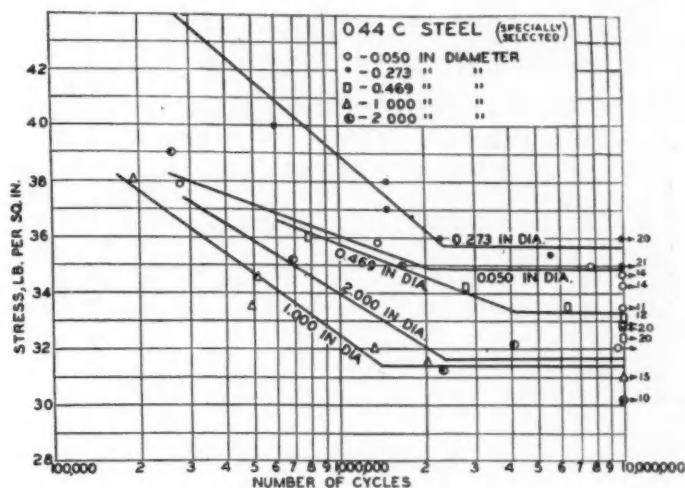


Fig. 2—Curves showing results of size effect in tests of medium carbon steel + + + + +

(University of Illinois), now range in cost from \$2.00 to \$6.50 each, with the usual size of specimen.

Nitriding Developments

The interest and, incidentally, the status of nitriding as a production process at the present time is undoubtedly reflected in the number of papers presented on various phases of this method of hardening. Aside from statements made during the discussions of certain of these papers, the range of details considered in them and their nature would lead to the conclusion that all the problems relative to the use of this process have by no means been solved. Most of if not all the engineering societies contributing to the exposition and congress had papers on this subject and the discussion of them was filled with the reflections of experiences gained through the use of the process by metallurgists and engineers during recent months.

R. S. Sergeson in collaboration with M. M. Clark in a paper "Nitriding Analyses—Their Physical Properties and Adaptability," given before the A.S.M.E., and with H. J. Deal in one entitled "Further Investigations in Nitriding" (A.S.S.T.), contributed much in informative material during the various sessions. In the first paper the authors give the range of analyses and physical properties of the existing types of chrome-aluminum-molybdenum nitriding steels including results of some impact tests. These steels all have the same content except that

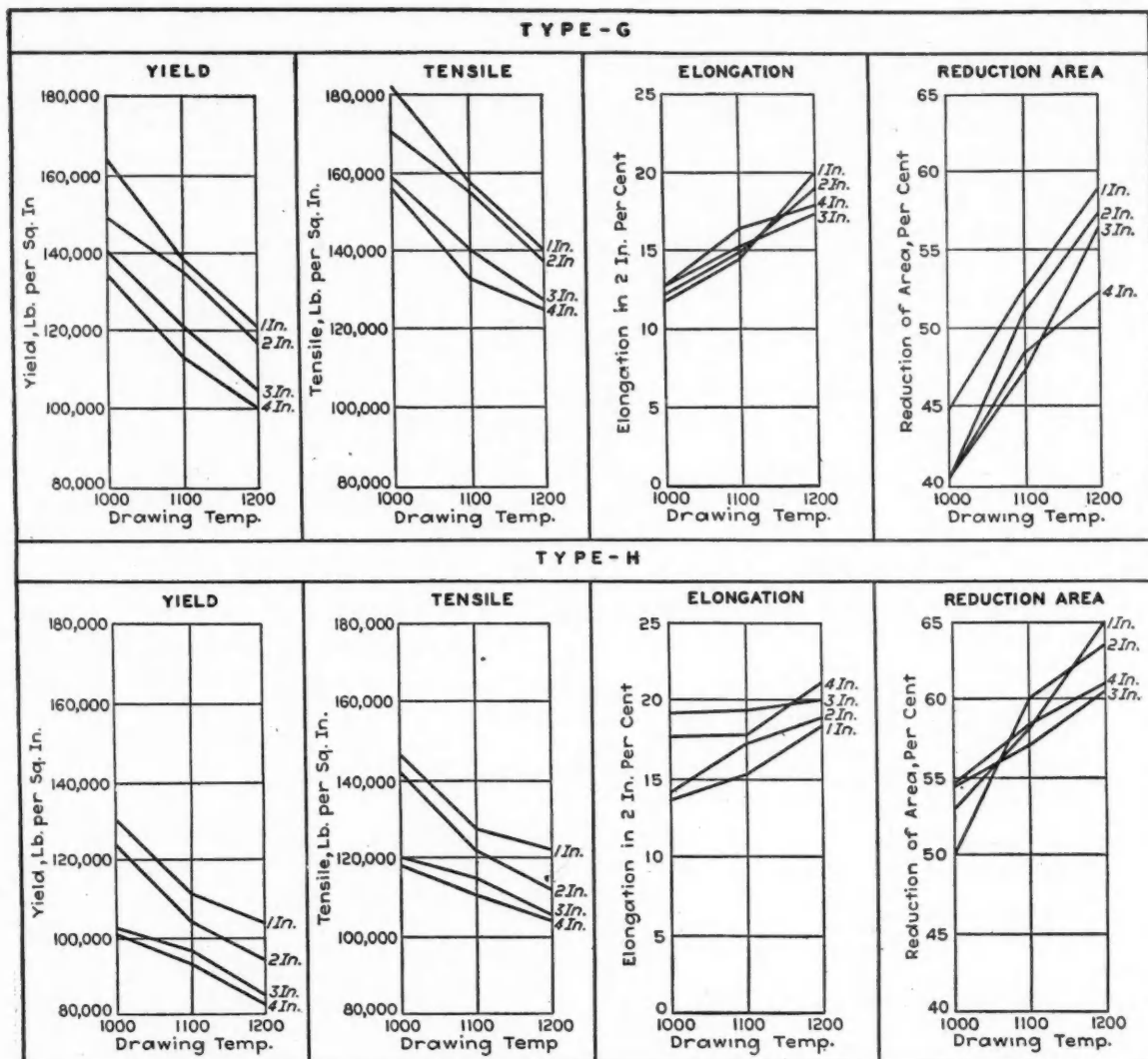


Fig. 3—Yield joint, tensile strength, elongation and reduction area for Types G and H nitralloys + +
Type G—0.30/0.40 C Type H—0.20/0.30 C

of carbon, namely 0.40/0.70 Mn, 0.80/1.30 Cr, 0.15/0.25 Mo, 0.60/1.20 Al, with the C content ranging from 0.10/0.20 to 0.55/0.65 in the four grades now available (Fig. 3). It was stated that at temperatures of 2175-2250 deg. Fahr. all these steels are being forged with no difficulty, and a quenching temperature range of 1700-1750 deg. Fahr. was recommended as a result of a study of the microstructures of specimens quenched at various temperatures. Specimens of Nitralloy G stock 1 1/3 in. dia. (0.34 C) when heat-treated and nitrided showed an increase of about 15 per cent gain in yield strength with a slight increase in ultimate strength compared with heat-treated specimens not nitrided. The same material showed about twice the resistance to fatigue failure as the non-nitrided specimens, hence it was concluded that at least in small sections the nitrided case actually increases the fatigue limit of the steel. Recommendations for the various grades of nitriding steels to be used for many automotive parts were also given, together with illustrations of successful applications.

In the paper before the A.S.S.T., Mr. Sergeson and Mr. Deal reported the results of tests on the use of various materials for nitriding containers, results of corrosion tests on the nitrided surface and discussed the subject of denitriding. Containers of plain carbon plate steel, of stainless iron, of monel metal and other materials, as well as those coated with hard and chemical resistant enamels, were tested, with results favoring containers of monel metal, although those coated with chemical resistant enamels merited serious consideration.

In the corrosion tests Nitralloy was shown to have little resistance against sulphuric or hydrochloric acids, better resistance against a 20 per cent sodium chloride solution (both still and aerated), until the nitrided case is penetrated when the core is rapidly attacked, and excellent resistance in the salt spray test. It also resisted attack when run against brass bearings immersed in still and aerated tap water as well as other corrosion solutions, thus proving the adaptability of the material for pump shaft and other similar applications (Fig. 4). It was stated that the material cannot be considered satisfactory for engine valves due not only to the fact that ethyl gasoline pits their surfaces, but also since exhaust

valves attain temperatures of from 1400 to 1500 deg. Fahr., and Nitralloy will not stand up for even short periods of time at temperatures above 700 to 800 deg. Fahr. without scaling. Applications in piston pins of bus and airplane engines have proved satisfactory, the latter when run direct in aluminum alloy connecting rods. Nitralloy does not corrode in the presence of liquid ethyl fuel, crude oil, nor natural gas combustion products.

Denitriding and Renitriding

The subject of denitriding proved to be of especial interest at the meeting, since many occasions arise wherein it is necessary to soften the surface, perform machine operations and again harden the part for reuse. Examples such as the alteration of core dies in the die-casting process and the forging and upsetting of die inserts were mentioned.

While the surface can be readily denitrided, Messrs. Sergeson and Deal stated that renitriding presents serious difficulties, in that the denitrided but unmachined surfaces cannot be rehardened if their hardness falls to about 250 Brinell. It was therefore believed that in order to obtain high or maximum surface hardness by subsequent nitriding, it is necessary to remove entirely all of the denitrided case.

In the discussions following these papers on nitriding, much comment revolved around the amount of dissociation of ammonia gas required to give most productive and beneficial results. Granting that much depended upon the design of the furnace, the amount of charge or load in the furnace and other similar factors, J. P. Walsted, who, with V. O. Homerberg, presented a paper on "Case-Hardening With Ammonia Gas," stated that 30 per cent dissociation (this per cent passing out of furnace) gave good results, yet other tests showed that the process could be operated satisfactorily with dissociation running to much higher figures. It was apparent that additional investigative work was necessary to establish desirable limits under the varying conditions of operation and covering types of furnaces available. For instance in the discussion of paper on "Nitriding Furnaces and Equipment," by W. J. Merton, of the Westinghouse Electric and Mfg. Co. (East Pittsburgh), it was brought out not only that very erratic results were being obtained in applications of the nitriding process, but it was indicated that higher nitriding temperatures and dissociation rates in excess of 50 per cent would give desired results. Much was also stated to depend upon whether or not the nitriding action was started slowly enough to assure an atmosphere in the furnace of pure ammonia and since having once established an initial nitride coating there was "little then to worry about."

Reduction of Time of Nitriding Cycle

Concurrent with the above mentioned problems is that of reducing the time required for completing the nitriding operation, and this formed the basis of a paper "Nitriding in Packing Materials and Ammonia," by A. B. Kinzel and John J. Egan of the Union Carbide and Carbon Research Laboratories.

After first establishing a means of evaluating the hardened surface or case as to its hardness, ductility and depth, they presented the results obtained with metallic and non-metallic accelerators when used as packing materials in the nitriding container or pot. It was shown that finely divided magnesia, copper gauze, chips or filings, silica flour, lamp black and other materials produce increased depth of case in a given time as compared with nitriding in ammonia alone. The uniformity of the process was thought to be insured when packing materials were used on chromium-aluminum and chromium-vanadium nitriding steels:

Information relative to the cost of operating the nitriding process was also given during the technical sessions on nitriding. It was stated that when the operation is first started about 10 lb. of material can be nitrided per lb. of ammonia, but later more is required. One speaker gave results of an actual 30-hr. run in which 850 lb. of Nitralloy G was hardened to a depth of 0.010 in. using 960 deg. Fahr. temperature. The power required was 340 kw. hr. and 40 lb. of ammonia gas was consumed or about 35-40 kw. hr. per lb. of material and 4.5-5 lb. of ammonia.

Some of the many additional points brought out at the sessions on nitriding may be summarized briefly as follows:

Nickel is considered best of all coatings to prevent nitriding of a surface although chromo water glass mixture is also good.

While some parts, such as rings and bushings, may decrease in diameter when nitrided, usually they increase in size with growth exaggerated at corners, hence rounding of edges is desirable for this reason as well as to prevent excessive brittleness. It is considered necessary to make a test run in order to determine the amount of growth in a given case, which although usually independent of the

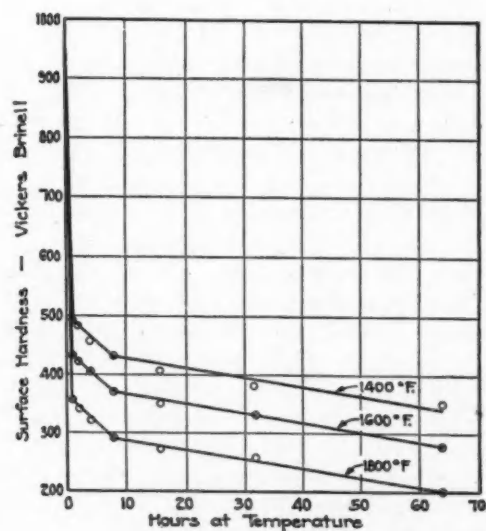


Fig. 4—Curves showing effect of time and temperature on surface hardness of nitrided case + +

diameter may vary from 0.001 in. to 0.008 in. in thin sections.

Nitralloy is stiffer to forge than corresponding alloys not containing aluminum, the degree of additional stiffness being about 15 per cent based upon the number of hammer blows required for a given change in form.

While nitrided gears have been used in Europe to reduce gear noise, there are no general applications in this country since the cost is considered too high.

The successful application of Nitralloy in deep drawing dies depends greatly upon design.

Broaches of Nitralloy used for broaching bronze have shown excellent results with life 10 times that for usual materials.

Nitriding process is by no means standardized nor have its limitations yet been determined.

A.S.M.E. Machine Practice Sessions

Robert T. Kent, of Divine Brothers Co., in his paper on the "Fundamentals of Machine Polishing" presented a complete review of the many variables affecting polishing operations, so that this paper and one presented by B. H. Divine before the A.S.M.E. about two years ago may be said to summarize the subject in a broad and thorough manner. In the discussion of this paper Floyd T. Taylor of the Bullard Company after defining polishing as "art guided by science" emphasized several factors of importance. Due to the fact that the present maximum peripheral speed of polishing wheels is limited to the holding power of the glue, and that also water could not be used as cooling medium with such wheels, he believed that the availability of rubber or other cements should be carefully checked. He also mentioned the desirability of using synchronous motors to drive polishing wheels since they maintained constant maximum speed, and indicated that since 60 cycle current is usually supplied the 16 in. dia. wheel is the only one which can be driven direct if a surface speed of approximately 7500 ft. per min. is to be maintained. He stated that the measurement of "color" by the photoelectric cell now offered a means of definitely establishing its degree or quality on a comparable basis.

Mr. Herbert Chase emphasized the lack of standardization existing in polishing operations at present and thought it was now time to bring polishing "out of the cave" into its proper place as a production process. Mr. Divine, in discussing the statements made relative to the use of water, said that while it could be considered, particularly as a cooling medium, oil not only cools but can be proved to modify the cut of the abrasive and was the means of producing the highest lusters. In the polishing of "stainless steel" he said that most of the difficulty lay with the metallurgist as in sheet form the material was "full of pits" which when subjected to polishing were torn or drawn into minute scratches, with resultant loss in smoothness and finish. No trouble of this kind appeared except in polishing sheets, and

for this work he mentioned that a new sheet polishing machine had just been developed which he felt would entirely eliminate any problems except those distinctly of a metallurgical character.

Such factors as ease of removing and replacing wheels, protection of the machine against its own abrasive, the necessity that shops recognize that polishing cannot be expected to overcome faults which lie elsewhere in the production of various parts, that it was possible to double the life of a wheel by improving gluing practice in many instances, and that the polishing of work to be chrome plated no longer was a problem, were brought out by those discussing Mr. Kent's paper.

Two other papers should be mentioned as having particular automotive value, one by Leon V. Quigley of the Bakelite Corp. on "Engineering Factors Involved in the Replacement of Metals by Synthetic Resins-Phenol Resinoid Molding Technique" and one on the "Repair of Worn Parts by Electrodeposition of Iron," by T. P. Thomas of the Westinghouse Research Laboratories. The former paper, aside from bringing out the fact that the value of products of the plastics industry is already "more than one-tenth that of the products from both the lumber and wood-working industries of the United States, stated that the automotive industry was third as a consumer of plastics (preceded only by the electrical manufacturing and radio industries), and outlined the factors and variables which determined whether or not phenol resinoids should be used. Details concerning the latter paper will be presented in a later issue of *Automotive Industries*.

Hardness Tester

Toward the close of the meeting a special paper by C. H. Bierbaum giving details of latest improvements in a "scratch" hardness tester was presented, this tester being for the determination of the hardness of microscopic areas. While the artificial sapphire has been used for some time as a cutting or marking medium, its use has been limited due to wear. Mr. Bierbaum said that recently F. F. Gilmore, of Boston, who had ground a diamond for the French Bureau of Measures was now able to grind diamond points which appeared sharp under 2000 deg. of magnification with angles and lines also accurate and straight, so that it was now possible to obtain a reasonably accurate measure of one micron.

Welding Society Sessions

Aside from the many papers dealing with specific applications and problems in welding, probably the most heated discussion of the Society's sessions revolved around the report of the Committee on Standard Tests for Welds, with the result that it was considered desirable to make further studies and investigations before any definite tensile test specifications could be finally established. Details covering the work of James W. Owens as given at the welding test symposium are to be presented in the October issue of the A.W.S. Journal.

JUST AMONG OURSELVES

Factory Influences Traveler's Attitude

A GOOD many dealers and distributors consider the factory traveling man as a difficulty second only to their used car problem.

In the old days the job of a factory traveler was chiefly that of getting orders by salesmanship if possible, by threats of cancellation or pressure if necessary. That still seems to be the conception some factory travelers have of their function, but this old guard is definitely in the minority today.

Improvement in relations between factory travelers and dealers has come about basically because of a change in attitude toward dealers by the factories which these men represent. Once upon a time a traveler could take a high-handed attitude toward the dealers in his territory and still be interpreting quite accurately and properly the policy of the factory for which he was working. Not all of the malodorous traditions surrounding the factory traveler were developed by the travelers; their factories had plenty to do with them.

Difficulties Mount in Interpreting Changes

FACTORY policies regarding dealer relationships have undergone radical change in the last five years. The high-handed take-it-or-quit attitude is uncommon today, where it was common five or ten years ago.

But ability of factory travelers to interpret this new attitude naturally has lagged be-

hind, because the average factory traveler is merely a human being and rarely a genius of any kind at that.

But even in attempting to interpret properly factory ideas, in trying to get dealers to use standard methods recommended and tested by the factory, the average traveling man labors under certain definite difficulties. For one thing, he often is trying to live up to a title which indicates an authority that he doesn't have. To preserve dignity, he is likely to be found pretending some of that power which he lacks.

Opposition from Dealers Has Psychological Basis

HE is trying to help and educate men who, for the most part, earn more per year than he does; except insofar as he can identify himself purely as a representative of the big factory institution, his expressions to dealers meet with a certain psychological opposition regardless of their intrinsic merit.

This opposition comes about, we believe, partly because this lower paid man is represented usually to himself and to the dealer as a territorial sales manager or supervisor. "Here's this fellow comes around to tell me how to run my business and he can't earn half as much as I do. If he's so good why doesn't he have a better job?" We've all heard that thousands of times from dealers.

Some manufacturers, intensively training their factory travelers, have tried to offset this situation by making travel-

ing men feel that their job is to help, to assist dealers rather than to *manage* them. Removal of the power of cancellation from the hands of the factory traveler has been one important practical move in emphasizing this idea both to the traveler and the dealer.

Names and Titles Shade the Approach

NEVERTHELESS, isn't the man who is called a manager of a supervisor always going to feel it necessary—in order to keep his own ego properly inflated—to approach and act toward a dealer as though he were really the executive and the dealer more or less under obligation to agree with him?

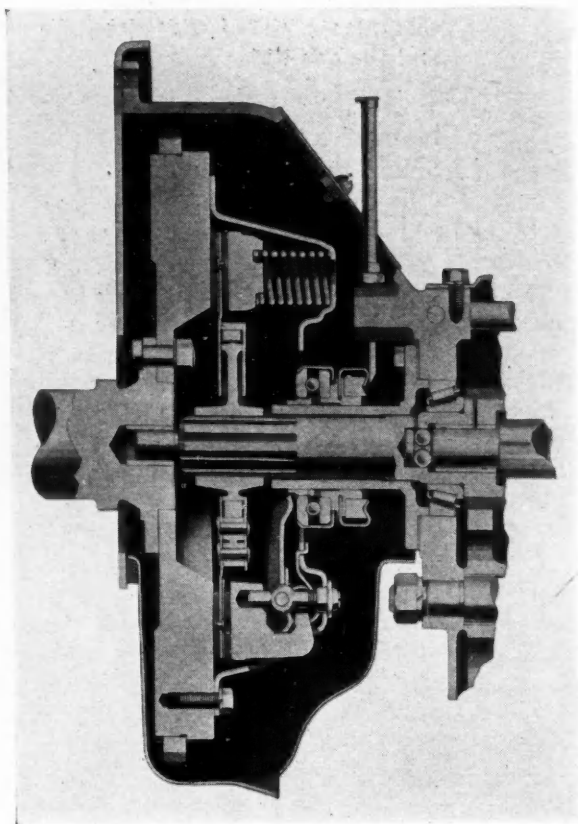
If his function is not to be that of manager—and it isn't any more in many practical instances—isn't there some other title that might be developed which would better express the new function the modern factory traveler is supposed to perform?

There is something in a name—eventually at any rate. An "assistant to the general manager" in a factory approaches and acts toward other executives differently than does the "assistant general manager" even though he may be operating on many of the same functions—at least it has seemed so in cases which we have watched. The same thing, perhaps, might be true in the case of the factory traveler.

Few of these men—even the good ones—actually are capable of being sales managers of their districts in the sense that the factory sales manager is a sales manager. Maybe they'd do better as just representatives or sales representatives. Some of the most constructive, useful, important men we know in the sales field are just "salesmen."

Maybe we're all wrong on this, but it does seem worth thinking about.—N. G. S.

Nash Offers Four Distinctive Engine



Rubber inserts between hub and driving plates are used in clutches of all new Nash models + + +

TWO new eight-cylinder models have been added to the line of the Nash Motors Co., one with an L-head engine to occupy the same price class as the Single Six last year, the other with a valve-in-head, twin-ignition engine to take the place of the former Twin-Ignition Six. The Single Six is being continued, but is offered at a materially lower price, thus bringing Nash into the low-priced six-cylinder field. Finally, the power of the largest eight of the line has been increased.

The new line thus comprises four chassis models: a six in the \$800 range, an L-head, 75-hp. straight eight in the \$1,000 class, and two valve-in-head, twin-ignition eights. Prices on the new models are as follows:

Model	6-60 Series	8-70 Series	8-80 Series	8-90 Series
4-door Sedan	\$845	\$995	\$1,295	\$1,565
Touring	895
2-pass. Coupe	795	945	1,245	1,695
2-4-pass. Coupe	825	975	1,285	1,745
2-door Sedan	795	None	None	None
Special or Town Sedan..	None	955	1,375

L-head and twin ignition eights added to line, with single six bringing the company into the low-priced field + +

By Athel F. Denham

Nash Merchandising Plan—

Approximate Number of Dealers . . 3000
Previous Model Announced Oct. 6, 1929
Approx. Sales of Previous Model . . 40,000

Type of Campaign—

Teaser copy, special announcement copy and regular advertising schedules in newspapers, in addition to national magazine copy

Dealer Helps—

Including direct mail, window posters, catalogs and folders, will be supplied free of charge

New Dealer Contract Features—

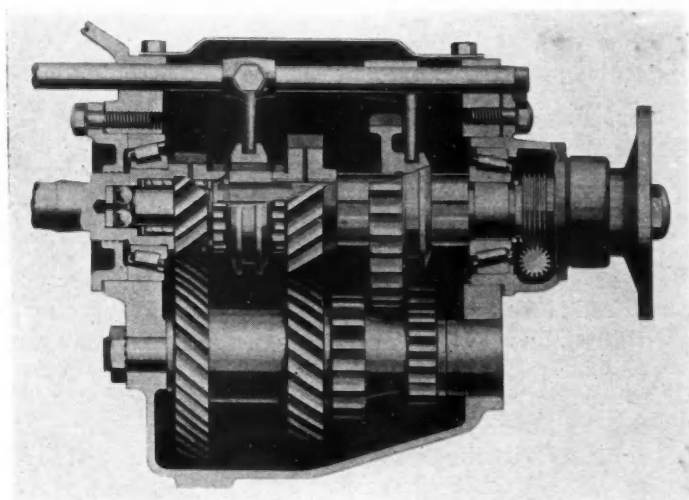
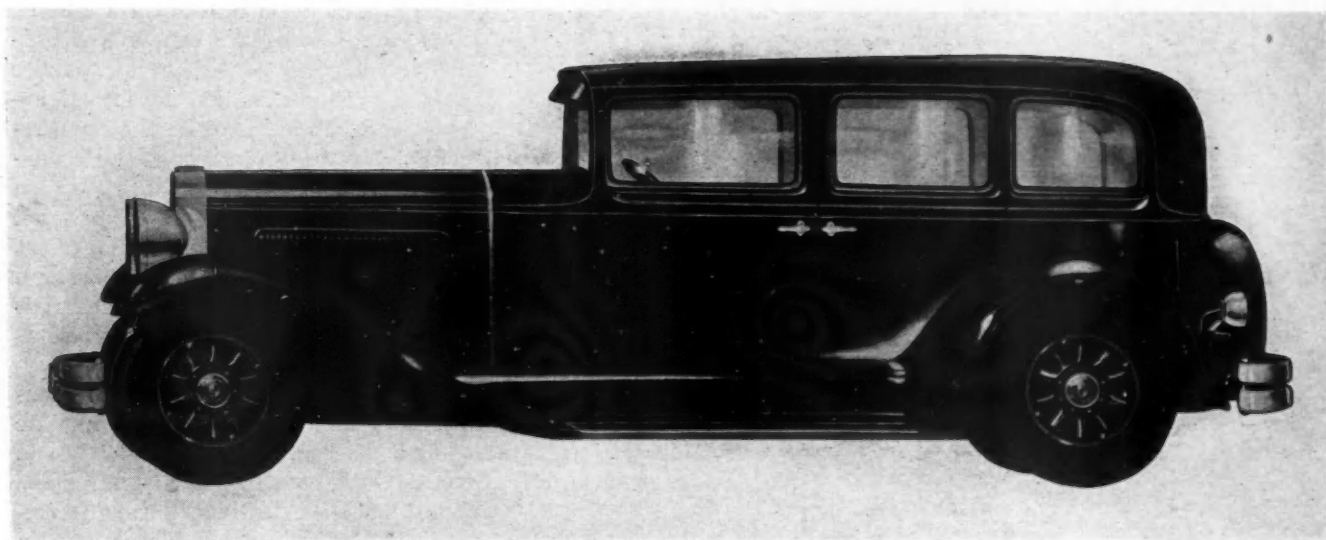
Junking Plan

Labor Guarantee during warranty period
Increased service parts discounts

On the 8-90 series there are in addition the following models: Cabriolet, \$1,695; seven-passenger Sedan, \$1,925; seven-passenger Limousine, \$2,025; Ambassador Sedan, \$1,825; Victoria, \$1,765.

Body changes are not radical in character, although a number of important improvements have been made. Moldings are narrower. The two lower-priced eights are lower than former comparable models. Sedan doors shut against each other in the center, concealing the center T-iron pillar. Fender-type parking lights are provided on the eights. The two lower-priced eights, the 8-70 and the 8-80, have etched copper kick plates, while the largest, the 8-90, has these finished in chrome plating, and chrome-plated bars on the running

Designs in Four 1931 Models



Helical constant mesh gears for countershaft drive and second speed on the Nash 8-90 series + + + +

board side-splashers lend a certain distinctive touch.

It is in the mechanical end, however, that the major new features of the 1931 Nash line are found. With the exception of the 8-90 powerplant, which has aluminum-alloy connecting rods, as used last year, all of the engines have their connecting rods drilled for pressure lubrication to the piston pins.

Another important improvement is the provision on all three eights of the automatic Bijur chassis lubrication system. Clutch plates on all four models are now cushioned in rubber, and ball bearings have been

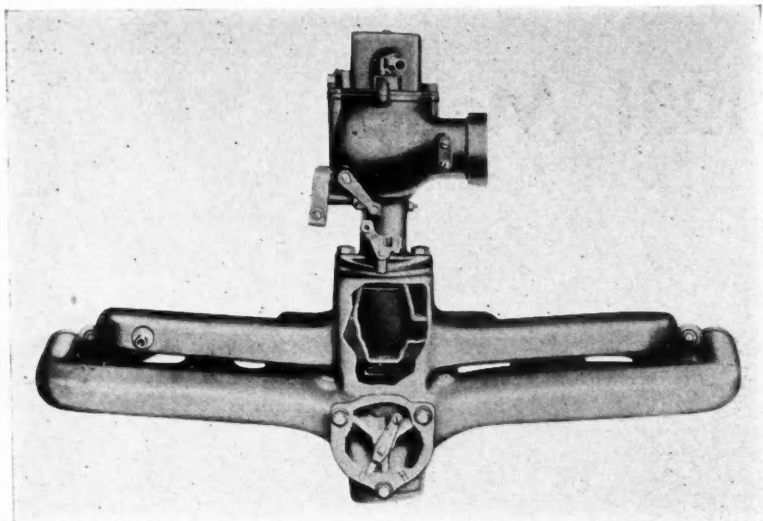
The Nash four-door, five-passenger 6-60 sedan lists at \$845, the lowest price ever placed on Nash cars + + + + + + + +

adopted for the clutch throwout on all models. Downdraft carburetors are used in the two lower-priced eights. The starter button is mounted on the dash on all models. Cooling capacities have been improved all around.

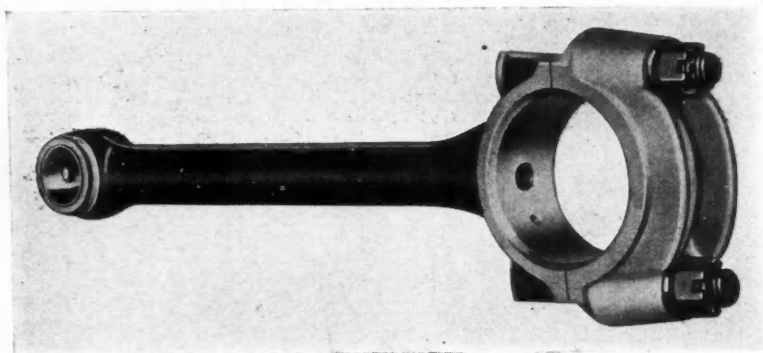
Very little compromise has been made in the way of using the same parts for different models. Take the frames, for instance. It is customary in the industry, where a factory turns out more than one chassis model, to use the same frame side rails (except for length) for more than one car. In the Nash line the 8-70 has a wider flange on the side rail than the Six; the 8-80 frame, while otherwise similar to the 8-70, is made of heavier stock, and the additional stiffness required for the 8-90 frame is provided by making the side rails deeper.

It is even more customary to use the same engine for two chassis. Nash, however, has four chassis and four distinct engine designs, one six and three eight-cylinder. The L-head in one of these eights, the 8-80, is substantially identical with last year's twin-ignition eight, and the 8-90 engine has almost 80 cu. in. more piston displacement and is said to develop 115 hp. All eight-cylinder engines have nine-bearing crankshafts.

In spite of the materially lower prices of the six, this



Carter downdraft carburetor with the float chamber cooled by intake air-stream is found in the Nash L-head eight + + +



Aluminum alloy caps on rifle-drilled steel connecting rods are used on the Nash 8-70 + + + + +

model now has a heavier frame. Fan noise has been somewhat decreased by changes in the pitch of the blades, and a sealing ring has been added to the water pump as increased protection against leakage and air-pumping. Important features of this car, considering its price class, are the use of invar-strut aluminum-alloy pistons, the drilled rods already mentioned, a torsional vibration damper on the crankshaft and a new cam-and-stud steering gear, with the gear mounted on ball bearings and the stud on roller bearings. Chassis lubrication is now through high-pressure fittings, and circulation in the cooling system is controlled by a thermostat in the cylinder-head water outlet.

The \$1,000 eight, of course, has an entirely new engine, this being Nash's first L-head, eight-cylinder design. It has a bore and stroke of $2\frac{7}{8} \times 4\frac{3}{8}$ in. (226 cu. in.) and is claimed to develop 75 hp. It also has the rifle-drilled connecting rods, invar-strut aluminum-alloy pistons, and torsional damper on the crankshaft.

An entirely new development in the engine of this new eight consists of light steel connecting rods with aluminum-alloy caps. As is known, at high speeds a large part of the load on the connecting rod lower bearing comes on the cap, and since aluminum-alloy has a higher heat conductivity and is better able to dissipate the heat than steel or iron, the new caps result, it is stated, in a decidedly lower temperature of the crankpin

bearing. The upper half of the rod being steel, expansion of the cap is well controlled. The adoption of these caps also has resulted in a weight saving of approximately 50 per cent on the caps, reducing centrifugal forces on the crankshaft and making for smoother running conditions. Servicing the engine is not affected by the larger light alloy caps, since they are removed before pulling a rod and piston, and the pistons and rods can be removed through the crankcase as formerly.

In the cooling system of the 8-70 engine an equalizer pipe serves to regulate the flow through the cylinder block. Cooling water is also passed around the exhaust ports. A cylinder-head thermostat controls the water circulation in this model also. Pressure lubrication to the camshaft bearings is provided on the 8-70 engine.

In the chassis are found the rubber-cushioned clutch plate and the new cam-and-lever steering gear mounted in anti-friction bearings. Bijur automatic chassis lubrication is standard equipment.

The powerplant used in the 8-80 series has been developed from the 85-hp., valve-in-head, twin-ignition eight used in the highest-priced Nash model last year. Downdraft carburetion, with a Marvel carburetor, is a new feature, and an air cleaner has been added. Cooling efficiency has been improved in this model also, and a nitrided pump shaft has been adopted to minimize wear and corrosion.

Easier shifting is a characteristic of the new transmission in the 8-90 series. Second-speed as well as countershaft drive gears are of the constant-mesh type and the change from second to high is made by means of a sliding dog clutch. The rubber cushioning for the clutch plate has been added, as has Bijur automatic chassis lubrication, the latter covering 20 points on the chassis. Metal spring covers and automatic radiator shutters have been retained.

Featuring the 8-90 series, the highest-priced line, is a new and larger valve-in-head, twin-ignition, eight-cylinder engine. It carries the aluminum-alloy connecting rods on the highest-priced eight last year, with enlarged section. The bearing caps for the nine-bearing crankshaft have been ribbed for increased stiffness.

In this powerplant, dual manifolding and a dual up-draft Stromberg carburetor are used. An improved type of fan is used, as well as a nitrided water-pump shaft. Clutch pedal pressure has been decreased and the rubber-cushioned type of plate adopted. Frames are heavier and brake linkage improved.

Few French Models Are New At Paris Automobile Salon

Exhibitors are less in number than last year with a total of 93, of which 24 are American

General Motors does not occupy space allotted + + + + + + +

By W. F. Bradley
Special cable to
Automotive Industries

THE Twenty-fourth Paris Automobile Salon opened on Thursday with 93 exhibitors in the car section, of which 44 are French, 24 American, seven German, six Italian, five English, four Belgian, two Austrian and one Czechoslovak. General Motors does not exhibit as a protest against the system of allotting space. The number of exhibitors is smaller than last year, and six of the firms that rented spaces are not occupying them.

During the first three days the attendance was somewhat smaller than last year, and sales were said to be lagging. The number of American visitors is comparatively small. Few French makers have produced new models, the main effort of the French industry having been directed toward reducing production costs and building cars to sell as close as possible to the \$800 mark. Prominent in this division is the new four-cylinder Mathis, the cheapest type of which sells at \$700. M. Mathis will shortly return to the United States, sailing on Dec. 2, to complete plans for the manufacture of parts and engines there for assembly at his Strasbourg plant. He is also developing a scheme to assemble in other European countries.

Berliet has placed on the market a four-cylinder, 91 cu. in. model selling with sedan body for \$800. Chenard-Walcker has a new big-production four-cylinder car with a 134 cu. in. engine selling at \$1,340 for the four-door sedan. Peugeot is stepping up production on its Model 201, which is of the same general type as the Berliet and Mathis.

No radical changes have been announced by Citroen, who is continuing his four- and six-cylinder models with roomier bodies. Silentbloc bushings are now used in the spring shackles, and it is reported that Perrot-Bendix brakes will be used from next January on. Renault's most important change is the adoption of a unit powerplant in place of the former separate engine and transmission combined with torque tube. Love-

joy shock absorbers and Stromberg carburetors have been adopted.

Among new French models is a Bugatti straight eight with 305 cu. in. engine having two valves per cylinder and two overhead camshafts, the engine being furnished either with or without supercharger. A three-speed transmission is mounted on the rear axle. The Ballot firm, which is now owned by Hispano-Suiza, has produced a six-cylinder model with 275 cu. in. displacement. The engine has an aluminum alloy cylinder block with nitralloy liners and is of the same general design as the big Hispano engine, but all chassis details are of Ballot design.

Delaunay-Belleville is out with a straight eight equipped with a Lycoming engine. The only French sixteen-cylinder car in the show is a Buccilai with front-wheel drive.

Three Front Drives Shown

There are no new developments in front drives, the only examples at the show being the Cord, Ruxton and Tracta. The last mentioned is now being fitted with a Hotchkiss six-cylinder engine. There are no new systems of independent springing, but all of the makes which have used this feature in the past are being continued. Transmissions with silent next-to-highest gear and two-speed auxiliary transmission or overdrives for use with the regular three-speed gearbox are a prominent feature. A notable transmission with silent third speed has been developed by the Hotchkiss Co. Voisin is using the Cotal planetary auxiliary drive with magnetic control on a six-cylinder, 13-hp. chassis, but uses a conventional transmission on his twelve-cylinder jobs. An increased number of straight-eight models is being shown, and there are also more four-cylinder models in the low-priced class.

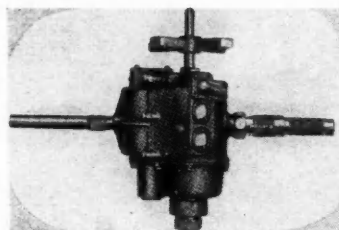
Central European manufacturers, with 10 representatives, occupy a prominent position at the show and present many mechanical novelties. Opel and N.A.G. both rented space, but have no exhibits at the show. A new model with a straight-eight, valve-in-head engine of 467 cu. in. displacement is being exhibited by Mercedes. This is fitted with a Rootes blower-type of supercharger, driven at four times crankshaft speed

(Continued on page 539)

NEW DEVELOPMENTS—AUTOMOTIVE

No. 44 Little Giant Pneumatic Drills

THE Chicago Pneumatic Tool Co., New York, N. Y., announces the No. 44 line of Little Giant Pneumatic Drills to supersede their No. 2 line.

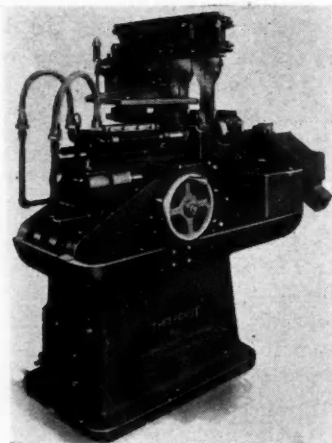


The No. 44C in three capacities, 1¼, 2 and 2¼-in. diameter drills, is non-reversible, while the No. 44RCA in the same range of sizes is of the reversible type.

Some features of these new tools are: long-stroke, block-type motors with valves and pistons in one casting; sensitive throttle control; split crankcase, and counterbalanced crankshaft.

Threadnut Automatic Nut Tapping Machine

THREADNUT No. 1, a new double spindle automatic nut tapping machine, with a range in sizes from ¼ in. to 7/16 in. U.S.S. or S.A.E. hex and square nuts, is announced by the Automatic Nut-Thread Corp., Philadelphia, Pa. The special feature of this machine is two tapping spindles fed by a single hopper of the rotary disk type. Two centrifugal pumps are provided, one for each spindle, which force the coolant liquid through a flexible steel hose to the tapping



spindle playing directly onto the tap.

As a safety feature should one of the spindles become clogged, the nut pusher on the spindle affected will automatically compress and the other spindle will continue until the operator has a chance to remove the obstruction.

Change gear boxes, easily accessible, are provided so that changes in tapping speed or lead are easily made by slipping the gears on and off the studs whenever necessary. The stand-

ard machine is furnished with single clutch pulley 7½ in. x 3 in. for belt drive. Provision is made for the application of motor drive, using hinged brackets at the rear of the machine under the pan so that the motor is out of the way and floor space is conserved. Either multiple "V" belt, silent chain drive or flat belt is optional for motor drives, which are fully protected with proper guards.

G.E. Float Switch With Mercury Contacts

FOR use in atmospheres where the open-type mechanical contacts may be subject to corrosion or where exposed mechanical contacts are unsuitable for other reasons, the General Electric Co., Schenectady, N. Y., has developed a new float switch with mercury contacts. The mercury contacts, moreover, make the device suitable for heavy duty, and it can be used for connecting motors up to the following capacities directly to the line:



Circuit	Motor H.P.	Voltage	Amperes Capacity Switch
a-c. single-phase	½	110	10
		220	5
		550	2½
a-c.	¼	110	10
		220	5
		550	2½
d-c.	¼	80	15
		125	10
		250	5

Float switches are used where control devices are to be actuated by the level of a liquid in a tank or other reservoir. For example, where it is desired to replenish a reservoir when the water falls to a predetermined minimum, the switch can actuate control devices which will start a motor-operated pump at the proper time.

The mercury switch used in the new float switch is known as a Kon-nec-tor and is a product of the General Electric Vapor Lamp

PARTS, ACCESSORIES AND PRODUCTION TOOLS

Co. It consists of a hard glass envelope containing a quantity of mercury and having two inleading wires. The envelope is so constructed that when the switch is in the closed position the mercury forms a continuous stream from one inleading wire to the other. In the open position the mercury breaks into two distinct pools so that one of the inleading wires is immersed in each, with an open space between the pools. Thus circuits are made and broken in the mercury and never between the mercury and either of the inleading wires. The glass envelope is filled with an inert gas which prevents oxidation and the establishment of an arc upon opening a circuit under load. As a result there is no corrosive action.

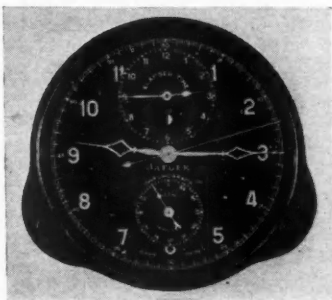
Quigley "Q-Seal" Expansive Compound

THE Quigley Co., Inc., New York City, manufacturers of Hytempite and Triple-A Protective Coatings, have placed on the market, Q-Seal, a plastic, expansive compound for sealing joints. The compounding of this material was made possible by the discovery of a mineral, which is not only a natural lubricant and preserver of metal, but when subjected to heat expands to several times its normal volume.

Q-Seal is easily applied with a brush. It seals joints leak-proof, prevents rust and corrosion. Joints fabricated with it may be broken with ease regardless of age or service conditions.

Jaeger Announces Two Chronoflite Models

TWO new models have been added to the Jaeger line of airplane clocks by the Jaeger Watch Co., Inc., New York. These are both Chronoflite models with split-second hand (indicating in fifths of a second) and elapsed-time dial with hour and minute hands, one model for general airplane, speed-boat, and motor-car use, and the other for special equipment on the new Cadillac series.

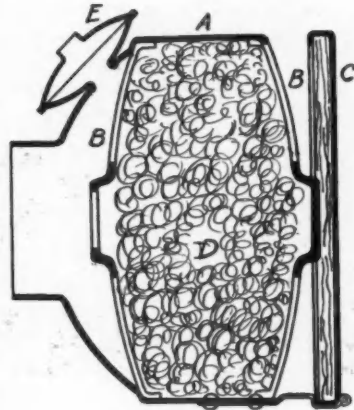


In addition to being used for aeronautical

timing these new Jaeger Chronoflites can be used for timing horse races, motor boat races or at aviation meets. The movement is an 11 jewel, 8-day bimetallic-balance type. The new models are finished in black, with black dials with white figures and hands. However, bezels can be supplied in chromium and the figures and hands treated with radium.

Smith Intake Silencer Gives Warning for Cleaning

A COMBINED air-intake silencer and air cleaner, introduced in England by Frank Smith & Co., Elland, Yorkshire, is being adopted by two or three British car manufacturers for their 1931 models. In one respect it is reminiscent of the Studebaker intake silencer in that the air is silenced and cleaned by being compelled to pass through a chamber packed with metallic "wool." The shape and dimensions of the size for a 1½ in. carburetor intake are shown in the accompanying sectional view.



A special feature is the warning device *E*, from which a continuous whistling sound emanates when the "wool" becomes so choked with dirt as to give rise to back pressure; under those conditions the increased negative pressure on the carburetor side of the device causes air to pass inward through the whistle with sufficient velocity to give rise to the warning sound. The wool is held in place by the twelve-legged spiders *B*, which are push-fit in the cylindrical chamber and are prevented from moving axially by the cap-plate *C* secured by three flat springs (one of which is shown). This cap-plate is lined with felt, which is said to assist in preventing power roar.

Baird Horizontal Six-Spindle Lathe

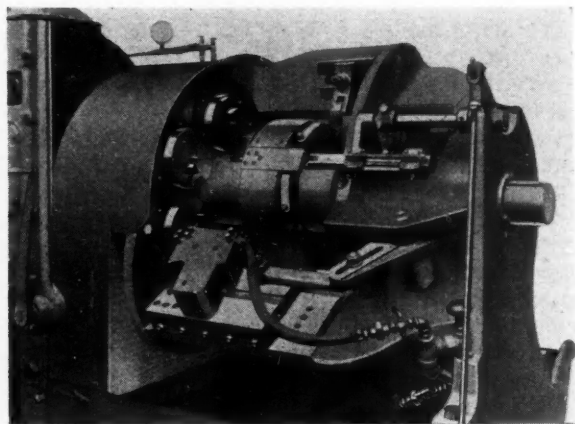
HERE is the work end of this new product of the Baird Machine Co., Bridgeport, Conn. The rest of the machine is very similar to the

New Automotive Developments

Baird Horizontal Six Spindle Chucking Machine. It was designed to handle work best turned on centers and the center bar of the machine carries a turret containing the tail centers, this bar and turret indexing with the spindle turret. This tail center turret is adjustable longitudinally to suit the length of the work.

An important feature of this machine is the automatic take-up for looseness or slack on centers which develops in doing work of this nature. At each station, the slides which carry the centers are unlocked, the looseness taken up and the slides again locked, all done automatically.

For ease and speed in unloading and reloading, the tail centers are withdrawn by the operator placing his foot in a neutral position on a foot treadle leaving both hands free to handle the work. When the machine is arranged "Double Indexing," two pieces of work are unloaded



and loaded and the turrets index two stations at each cycle of operations and on the operator raising his foot from the treadle, one center advances before the other so that he can locate first one piece of work on its center and then the other, doing this more easily and more quickly than if he had to line up two pieces on their respective centers at the same time.

Another feature is the automatic safety control and machine stop. While the foot treadle is depressed in the ordinary process of unloading and loading, the turrets cannot index. Thus possible damage and loss of time is avoided should the operator be late in getting the machine reloaded. Should the operator be late in getting to the machine to unload and reload, the machine would automatically stop when the cycle of operations is completed.

The machine is regularly provided with four longitudinal slides which are carried on the head and tail stocks of the machine and receive their motion from the cam drum in the head. Through adjustable link connections, each slide may be given the same or a different stroke. Also the tools are easily get-at-able to set or adjust, take out to sharpen, etc. When set up

"Single Indexing" five work stations are available for each piece, four stations being provided with the regular longitudinal tool slides and the fifth station can be provided with some other tool arrangement, cross slide, cross drilling attachment or whatever it is practicable to apply to do the work or operation needed. When set up "Double Indexing," two pieces would be unloaded and loaded at each cycle of operations and two work stations or equivalent to two lathe operations would be available for each piece. If required, chucks or other holding fixtures can be used on the spindles in place of and, in some cases, in addition to the center.

The net weight of the machine is about 12,000 lb.; floor space about 54 in. x 92 in. and it may be either belt or direct-motor driven.

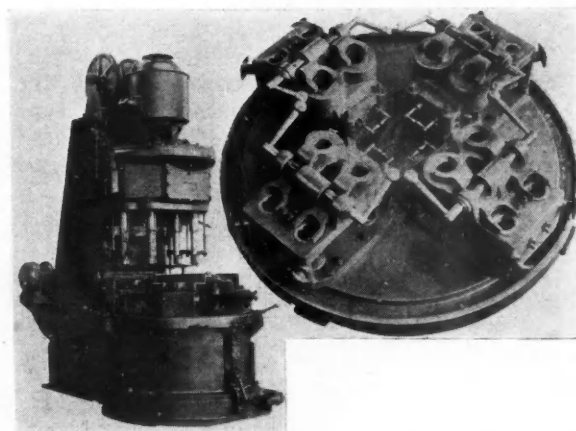
Putnam Rod Boring and Drilling Machine

THIS multiple boring machine is one of the line of Putnam Vertical Cylinder Boring Machines offered by the Putnam Machine Works, Fitchburg, Mass., Division of Manning, Maxwell & Moore, Inc.

The head is of unit type with drive from motor to spindles through a minimum of short sturdy shafts. All bearings in the head are Timken Tapered Roller Bearings, mounted in heavy steel plates which are bored to very close limits.

All gears within the head are helical, with the exception of two gears which are used for change gears. These are spur tooth, and substitutions may be made to increase or decrease the spindle speeds 25 per cent. All gears are spline fitted to shafts and spindles.

The head is attached to a saddle which is accurately scraped and gibbed to vertical ways on column face. Head and saddle are actuated up and down by "Oilgear," the piston rod being direct connected to a lug on the saddle. The feed cylinder is bolted and doweled to the column in a cored recess between the vertical ways.



The cycle of rapid traverse, feed and rapid return is automatic after being started by operator. It can be started by handle or foot pedal, both in convenient locations. Manual

control can be used instead of mechanical at any time during the cycle.

The eight spindles in the head are arranged in two groups of four, and placed so a rotary table with four stations that indexes on quarters will line up with each group simultaneously. One group is tooled for roughing, having two twist drills and two core drills. The other group is tooled with reamers to ream the drilled holes. Each fixture station holds two connecting rods, so every time the head descends, two rods are roughed, two rods are finished, and the operator removes finished product from the third fixture and places new work in the fourth.

The indexing fixture table is semi-automatic in operation. During working operation, the table is clamped to the base on one wide flat bearing and a tapered cone bearing. When rotating to next position, the table is supported on heavy ball bearings mounted on the center stud. These allow table to rotate easily to next position, where a plunger locates fixtures for next operation.

Fixtures have quick acting clamps which are easy to operate. The entire cycle takes from one to three minutes, according to the class of work.

High Temperature Furnace With Reducing Atmosphere

THE General Electric Co. announces a production type furnace suitable for temperatures up to 2600 deg. Fahr., as an addition to its line of heat-treating equipment. This type of furnace is applicable for many processes, especially those that must be carried on in a reducing atmosphere such as copper brazing, the manufacture of Carboloy, or the brazing of cemented-tungsten-carbide tips to steel.

The heating element consists of molybdenum wire and operates in a hydrogen atmosphere. The hydrogen prevents both the molybdenum wire and the charge from becoming oxidized.

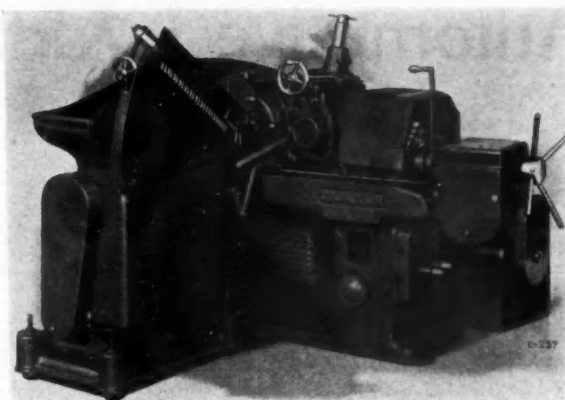
Feed-Matic Thru-Feed and In-Feed Hoppers

IMPROVEMENTS in Feed-Matic Thru-Feed and In-Feed Hoppers for automatically feeding work to Cincinnati Centerless Grinders have been announced by Cincinnati Grinders, Inc., Cincinnati, Ohio. By using these hoppers in conjunction with centerless grinders, manual feeding operations are eliminated and in cases where the hoppers are operated to feed a battery of machines, a substantial reduction in labor is possible, since one operator runs a series of three or four machines.

One of the major improvements is embodied in the low work basin so that the dumping of work into hoppers is easier for the operator. These new hoppers are individually motor driven, easily removable from the centerless grinder, quickly adjustable for different sizes of work, and the mechanical arrangement is such that jamming of work or injury to mechanism is eliminated.

An adjustable tie rod keeps the hopper in

Parts, Accessories and Tools



proper position relative to the grinder. To compensate for wheel wear and to keep hopper in alignment for accurate feeding, a cross adjustment is provided. If desired, additional parts may be obtained so that In-Feed Hopper can quickly be converted to a Thru-Feed Hopper.

Crown Spiral Gear Drive for Burnishing Machines

THE Crown Rheostat & Supply Co., Chicago, Ill., has introduced another improvement in burnishing machine design with the adoption of the spiral gear drive which has been used so successfully in Crown gear-driven electric lathes. The drive gear is of high-grade steel, while the driving gear is of special phosphor-bronze, a combination said to be accepted for longest gear wear and driving efficiency.

The weight of this machine is 2250 lb. which provides an ample base for running at full speeds under heavy loads with the minimum vibration. This is especially true when the drum is loaded with heavy work. The No. 1 model has a capacity of one bushel; the No. 2 model has a capacity of three bushels. All of these Crown machines are equipped with clutch pulleys.

G. E. Control for Reversing Small Motors

THE General Electric Company, Schenectady, N. Y., announces a convenient reversing equipment for small motors. This switch is designed to handle squirrel-cage motors rated 1½ hp. at 110 volts, and 2 hp. at 220, 440, 550 and 600 volts, 25 to 60 cycles.

The switch consists of two contactors mechanically interlocked and having four sets of contacts and terminals. Three of these contact sets are for power circuits and the remaining one is for the holding circuit of the coil. The terminals are front connected and are marked to facilitate wiring.

Automotive Oddities — By Pete Keenan



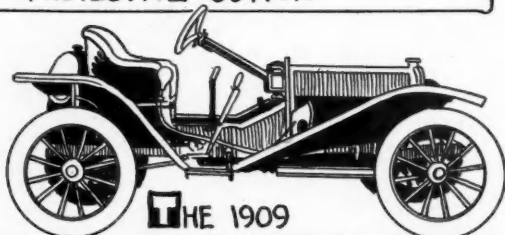
NOT A GAS ATTACK.
JUST A BRITISH MOTOR-
CYCLE RACER WEARING THE NEW
PROTECTIVE OUTFIT.



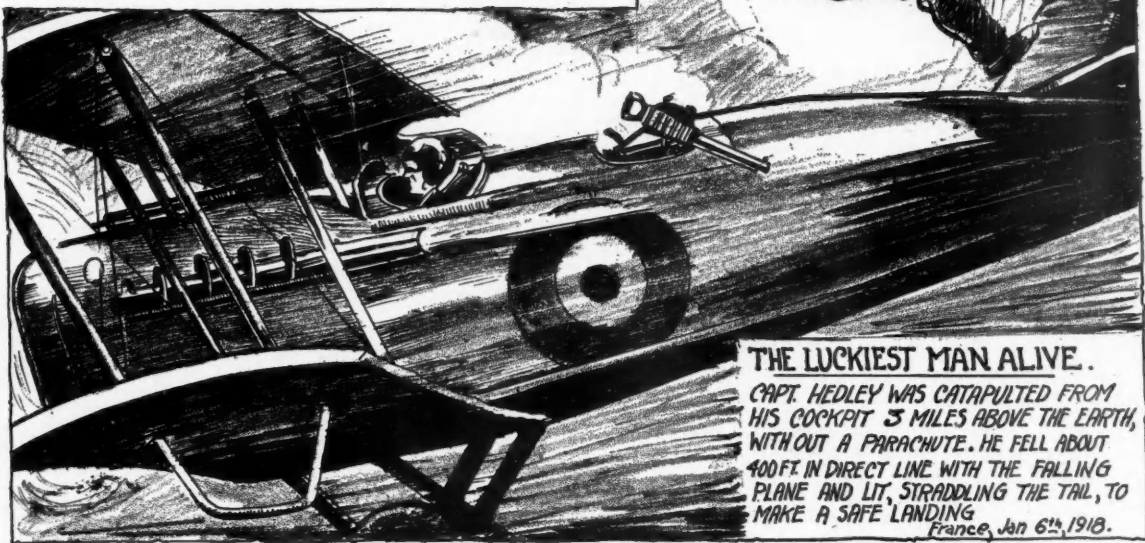
EUGENE CLARK,
A DEAF MUTE
MECHANIC OF AUSTIN,
TEXAS, IS REGARDED
AS THE MOST SKILLED
IN THE STATE ON THE
ADJUSTMENT OF
HORNS AND
LOCATING
SQUEAKS.



A MONKEY WRENCH
IS A MONKEY
WRENCH, NAMED
AFTER ITS INVENTOR.



THE 1909
HUPMOBILE ROADSTER WEIGHED AND COST LESS THAN
THE SIMILAR FORD MODEL PRODUCED THE SAME YEAR.



THE LUCKIEST MAN ALIVE.

CAPT. HEDLEY WAS CATAPULTED FROM HIS COCKPIT 3 MILES ABOVE THE EARTH, WITHOUT A PARACHUTE. HE FELL ABOUT 400 FT. IN DIRECT LINE WITH THE FALLING PLANE AND LIT, STRADDLING THE TAIL, TO MAKE A SAFE LANDING
France, Jan 6th, 1918.



NEWS OF THE INDUSTRY

Coordination Stressed at Highway Congress

International Body Holds Sixth Meet- ing in Washington

WASHINGTON, Oct. 9—Coordination of all forms of transportation, with particular emphasis on rails and highways, was considered today by the administrative section of the Sixth International Road Congress, meeting here this week.

Among other conclusions adopted by the administrative section were:

Strict control of public motor bus service, the establishment of feeder bus services to the railroads, the need of fostering automobile and bus operation for the purpose of producing new traffic, and for shipping smaller quantities of goods than could be handled profitably by rail, the need of traffic surveys, especially as to the development of feeder lines for other forms of transportation, and the desirability of establishing universal as well as regional roadway time tables.

The establishment of international classification of materials, methods and road types were urged at a meeting of another section.

All the conclusions reached in the section meetings will be submitted for approval by the Congress on Friday.

Sessions of the Road Congress are being held under the auspices of the Permanent International Association of Road Congresses. Roy D. Chapin, chairman of the board of the Hudson Motor Car Co., Detroit, headed the American organizing commission. More than 62 foreign countries were represented at the current sessions.

An exhibit featuring highway progress and methods in the United States and foreign countries was a feature of the Congress. Many prominent automotive executives were in attendance.

Ford Sales 41 Per Cent of Total

DETROIT, Oct. 9—Registrations of Ford passenger cars during the first eight months this year totaled 871,366 or 41.3 per cent of the 2,111,354 new passenger cars registered in the United States, according to Dow, Jones and Co. This compares with 972,608 or 32.8 per cent of the 2,964,746 new passenger cars titled in the like period a year ago.

The News Trailer

By Herbert Hosking

Mrs. Ernest N. Smith, wife of the tria's exec. v. p., returned from Europe last week via Britannia * * * and this week it's a *Duesenberg* for King Carol of Roumania * * * making a total of 390 hp. of *Cord* products acquired in two weeks * * * Norman de Vaux, Durant's California pres., is back native-sonning after Eastern conferences with W. C. * * * the *Mathis* car will issue from Oakland (Calif.) also * * * Roy H. Faulkner, *Auburn's* v. p., is back at his desk again after illness-fluenza * * * Dr. P. E. Doolittle is the new president of the Canadian Motorists, again * * * AVICO VO-SLYXBEP, if you get it by cable, means that the Navy requires a price on a tri-engined biplane-seaplane, according to the new aviation code published by the *Aeronautical Chamber* * * * Balkan papers please copy * * * latest *White* fleet roll-call shows 435 *White* trucks have traveled over half-million miles each * * * Henry Ford lunched with Sir Herbert Austin in London last week—discussed were sixes and sevens * * * W. C. Cowling, fordexecutive, placed wreath on grave of Sun Yat-Sen, founder of the Chinese Republic, in the name of Henry and Edsel Ford, at Nanking last week—the inscription: "To One Who So Well Expressed the Ideals of the New China." * * * She weighs 230 lb.; her husband threatened to buy an *Austin Bantam* * * * now she's suing for divorce on grounds of cruelty, and that's a fact.

September Production Off

WASHINGTON, Oct. 10—Automobile production for the entire industry during September is estimated at 226,361 units, according to the directors of the National Automobile Chamber of Commerce meeting here for the annual show drawing today. This represents a decline from August when production was 232,838 units, and compares with 429,729 units in September of last year.

Production for the first nine months of the current year thus becomes 3,061,983 units, as compared with 4,874,676 units for the corresponding period of last year, a decline of 37 per cent.

Production Group Hears C. E. Wilson

General Motors Official Suggests Attention to Stabilization Problem

DETROIT, Oct. 9—Consideration of possibilities of flattening out the production curve as a means to employment stabilization was suggested by C. E. Wilson, vice-president of General Motors, in his address at the production dinner of the Society of Automotive Engineers here last night.

Whereas production control has been used in the past to reduce and maintain inventories at the minimum, Mr. Wilson indicated that it might, in view of the automobile sales cycle, be used actually to increase inventories at times. The dinner last night closed the two-day Ninth National Production Meeting of the Society. Three sessions were held during the two days with more than 100 active production men attending each.

Other speakers at the dinner last night were: E. P. Warner, president of the society; J. A. C. Warner, general manager of the society, and John Younger, professor of industrial engineering, Ohio State University. Full details of the sessions and transactions during the meeting will be presented in next week's issue of *Automotive Industries*.

Battery Makers to Meet

NEW YORK, Oct. 7—National Battery Manufacturers Association will hold its sixth annual convention at the Hollenden Hotel, Cleveland, Nov. 7 and 8. No subjects have been announced but addresses will be made by executives of a number of battery manufacturers and by George M. Graham, vice-president of the Willys-Overland Co.

Sides Heads Committee

DETROIT, Oct. 9—F. B. Sides, export manager, Hupp Motor Car Corp., is chairman of the special Detroit committee of the National Automobile Chamber of Commerce which will entertain about 100 delegates to the International Road Congress following the Congress in Washington this week.

Show Drawing is Held in Washington

Nine More Cars in National Exhibits

WASHINGTON, Oct. 9—More than 54 makes of cars, truck and taxicabs will be exhibited at the National Automobile Shows at New York and Chicago next January, according to the drawing of the members of the National Automobile Chamber of Commerce, held here today in the United States Chamber of Commerce Building. This is nine more exhibits than last year.

The drawing was held in this city instead of New York, as in the past, because most of the manufacturers are attending the International Road Congress which is also in progress.

The New York exhibition will be held Jan. 3 to 10, and the Chicago Show, Jan. 24 to 31. The following makes of cars were allotted space:

PASSENGER CARS

Auburn, Austin, Buick, Cadillac, Chevrolet, Chrysler, Cord, De Soto, Dodge, Duesenberg, duPont, Durant, Essex, Franklin, Gardner, Graham, Hudson, Hupmobile, Jordan, LaSalle, Lincoln, Marmont, Moon, Nash, Oakland, Oldsmobile, Packard, Peerless, Pierce-Arrow, Plymouth, Pontiac, Reo, Ruxton, Studebaker, Stutz, Viking, Willys-Knight, Whippet, Windsor. Trucks: Chevrolet, Corbitt, Diamond T, Federal, General Motors, Maccar, Paige, Reo, Schacht, Stewart, S.P.A., Willys. Taxicabs: Checker, Dodge, Yellow Cab.

Aviation Credit to Continue

BALTIMORE, Oct. 9—Aviation Credit Corp., recently acquired by Commercial Credit Co., will continue its former operating plans and policies but a closer service connection will be established through the Commercial Credit network of branch offices in the principal cities of the United States and Canada. Commercial Credit Co. has operated Aviation Credit since its inception early in 1929.

Aviation Credit finances time sales for 23 airplane manufacturing companies.

Asks Elcar Receiver

SOUTH BEND, Oct. 9—A petition asking appointment of a receiver to conserve the assets of the Elcar Motor Co. of Elkhart, Ind., was filed in Federal Court at South Bend.

The papers were filed by Follansbee Brothers of Pittsburgh, together with a claim against the Elcar organization, manufacturers of Elcar automobiles, for \$3,500.

Warner Gets Order

DETROIT, Oct. 9—Warner Aircraft Corp. has received an order for 26 Warner "Scarab" engines from Ireland Aircraft, Inc., Garden City, N. Y. Engines will be used as standard equipment in the Ireland "Privateer," listing at \$5,800.

Brief News

National Lock Washer Co., Newark, N. J., and Milwaukee, Wis., has added a modern four-story, fireproof structure to their present buildings in Newark. It covers an area of 50,000 sq. ft.

St. John X-Ray Service Corp., 505 Fifth Ave., New York City, announces that it has arranged with the Westinghouse X-Ray Co., Inc., to sell Westinghouse equipment in the industrial field.

Worthington Pump & Machinery Corp., New York, announces that it has acquired the Gilman Mfg. Co., East Boston, Mass.

Weirton Steel Co., a unit of the National Steel Corp., announces that the structural and rail mill now under construction at its Weirton, West Virginia, plant is nearing completion and will go into operation by Dec. 1.

Palmer-Bee Co., Detroit manufacturers of conveyors, etc., announce the opening of district offices in Buffalo, Pittsburgh, Cleveland, Winston-Salem and Philadelphia.

Warner & Swasey Co., Cleveland, announces the appointment of Clifford S. Stillwell as sales manager. Mr. Stillwell has been associated with the company since 1912. His new connection begins as of Oct. 1.

Toledo Steel Products Co., Toledo, Ohio, announces that it has signed a contract with the Soviet-Russian government to furnish Toledo one-piece steel valves. Receipt of the order has necessitated installation of new equipment at the Toledo plant.

The Micromatic Hone Corp. will announce to the automotive trade within the next 60 days, a new service type cylinder-hone to be used in the reconditioning of passenger cars and trucks. Additions to the Micromatic staff recently announced are: B. Isom, formerly of the Hutto Engineering Co., to the Detroit territory; G. J. Batzer, in charge of the Cleveland territory, and O. W. Frank, in charge of the Eastern territory.

The Autocar Co., Ardmore, Pa., announces the opening of a new direct factory branch at 85 S. Kensico Ave., White Plains, N. Y. The new White Plains branch is the ninth Autocar factory unit in the metropolitan New York area, of which Frank D. Wait is the district manager.

Recommendation that taxicab business be turned into a "full-fledged public utility" with proper organization and public control is contained in the official report of Mayor Walker's commission on taxicabs of New York City. The commission was headed by Frank P. Walsh.

The Society of Automotive Engineers, Inc., will hold a National Transportation Meeting at the William Penn Hotel, Pittsburgh, Pa., on Oct. 22-24. A preponderance of attention is being paid to supervision and maintenance in the truck field by those interested in the meeting, according to John A. C. Warner, general manager of the society.

Arrow Aircraft & Motor Corp., Lincoln, Neb., announces that its September sales were slightly better than August but about 50 per cent off from July, when eight Aero sports planes were sold.

New York University School of Education has announced a series of normal courses for teachers of aviation. These courses include radio communication for airplane pilots and teachers of radio, airplane and aircraft instruments, air regulations, administration of ground schools, airplane engine and engine instruments, meteorology, air aviation. Information on the courses may be gotten from Rowland H. Spaulding, New York University, Washington Square, E., N.Y.C.

The Republic Steel Corp. announces that its new electric weld pipe mill went into commercial production Sept. 30.

The Allied "Die Caster," a technical house organ of the Allied Die Casting Corp., is now running a series of articles dealing with the application of die casting to modern industrial problems. Copies of this publication may be obtained upon request from the Allied Die Casting Corp., Long Island City, N. Y.

Durant Has New Six Line

Four-Cylinder Model Was Announced Earlier

LANSING, MICH., Oct. 7—Following announcement of its four-cylinder line, known as the 610 a few weeks ago, Durant Motors has just introduced a line of six-cylinder cars known as its 612. The new line is virtually the same chassis as the four-cylinder line with a wheelbase of 112 in. It is equipped with the continental red seal engine used in the 614. Prices of the three body models in this line follow:

4-door sedan	\$725
Coupe	705
Coach	710

The coupe in the 610, or four-cylinder line, has been reduced in price from \$695 to \$675.

Bus Operating Costs Drop

WASHINGTON, Oct. 6—The National Association of Motor Bus Operators announced today that operation costs have now reached a low-average of one cent per passenger mile.

The statement of the Bus Association, which is affiliated with the American Automobile Association, is based on a comprehensive study of motor bus operating costs, local and long-distance, throughout the United States in 1929. Reports were received from operators comprising about 20 per cent of those engaged in common carrier service.

They show that it costs only 1.19 cents per mile per seat to operate an average twenty-passenger bus and .92 cents for the average thirty-passenger bus, making an average of approximately one cent per seat per mile for buses.

Hupp Passes Dividend

NEW YORK, Oct. 7—Hupp Motor Car Co. at a directors' meeting last week passed the usual quarterly dividend of 50 cents on capital stock due at that time. DuBois Young, president of the company, stated that this move was made in view of the uncertain conditions prevailing in the industry and in order to maintain the company's cash position. As of Oct. 1, the company had cash and government securities to the amount of \$11,135,000 as against current liabilities of \$808,000.

Oklahoma Revenue Drops

OKLAHOMA CITY, Oct. 6—Revenue from the 4-cent gasoline tax, one of the principal sources of highway construction funds, slumped \$174,000 in September collections, report of A. S. J. Shaw, state auditor, revealed Oct. 1.

Collections amounting to \$1,029,080 compared to \$1,193,573 for the same month last year pointed out that decrease in the tax causes revenue to fall.

Nash Earnings Are 65 Cents a Share

Pays Dividend
at New \$1 Rate

KENOSHA, Oct. 9—Nash Motors Co. reports for quarter ended Aug. 31, 1930, consolidated net income of \$1,777,270 after depreciation, Federal taxes and after charging out expenses incurred in preparation of complete new line of automobiles. This is equivalent to 65 cents a share on 2,730,000 no-par shares of stock and compares with \$1,932,896, or 71 cents a share in preceding quarter and \$3,068,658, or \$1.12 a share in August quarter of 1929.

Net income for nine months ended Aug. 31 was \$5,492,678 after above deductions, equivalent to \$2.01 a share, against \$13,810,857, or \$5.05 a share in corresponding nine months of preceding fiscal year.

Cash and government securities on Aug. 31, last, amounted to \$39,483,952, as compared with \$42,011,405 on Nov. 30, 1929, the close of previous fiscal year.

Charles W. Nash, president, commenting on the quarter's operations, drew attention to the fact that the company, in order to place its dealers in a sound and liquid position, discontinued manufacturing its 1930 line in July.

He also pointed out that during the quarter there was a period of more than six weeks during which there was not an automobile shipped from the Kenosha or Milwaukee factories.

Nash Motors Co. declared a dividend of \$1, payable Nov. 1 to stock of record Oct. 20. Three months ago the dividend was reduced to \$1 from \$1.50.

Body Makers to Meet

DALLAS, Oct. 6—The second meeting of the Allied Commercial Body Manufacturers will take the form of a general convention at the Hotel Jefferson, St. Louis, Oct. 16-18, according to an announcement from A. A. Ritcheson, president of the American Body Co., Dallas, and of the Allied Manufacturers.

The association was formed at a meeting in Detroit, Aug. 18, with about 20 commercial body manufacturers represented. More than 200 are expected to be represented at the St. Louis convention.

USL Sales Set Record

NIAGARA FALLS, Oct. 9—Battery sales to dealers by USL Battery Corp., subsidiary of Electric Auto-Lite Co., during September exceeded by a substantial margin the best previous month in the company's history.

Eldred Leaves Hudson

A. J. Eldred has resigned as advertising manager of the Hudson Motor Car Co., it was learned here.

Ford Output Drops Slightly

DETROIT, Oct. 7—World production of Ford cars and trucks in September was 97,885 units, the Ford Motor Company announced today. This compares with 99,142 cars and trucks produced in August.

Perfect Circle Reports

HAGERSTOWN, IND., Oct. 7—Net income of the Perfect Circle Co. for the third quarter amounted to approximately \$160,000, September earnings being estimated, equal to about \$1 a share on the 162,500 shares of capital stock outstanding, according to C. N. Teetor, president. This compares with \$205,932, or \$1.26 a share in the preceding three months, and with \$265,380, or \$1.63 a share in the third 1929 quarter. Based on the above figures, net for the nine months would be \$527,857, or \$3.25 a share, as compared with \$761,084, or \$4.68 a share in the corresponding 1929 period. Cash and marketable securities on Oct. 1 totaled \$562,629, after the payment of the October dividend of \$81,250. The company reports that placement sales through jobbers in the first nine months of 1930 increased 6 per cent over the same period of 1929. The line has been increased this year by addition of new type rings.

To Meet With the President

DETROIT, Oct. 9—Robert C. Graham, vice-president of Graham-Paige Motors Corp. and chairman of the National Automobile Chamber of Commerce export committee, left yesterday for Washington where he will attend a meeting of the N.A.C.C. The special contact committee of N.A.C.C., of which all the directors are members, will meet with President Hoover today.

Budd Wheel Holds Up

PHILADELPHIA, Oct. 9—The Budd Wheel Co. is operating on a basis of 91 per cent of last year's average production, according to a statement from H. A. Coward, secretary.

Jordan Stockholders Asked to Deposit

Outside Interests Propose New Company

CLEVELAND, Oct. 9—Reorganization of the Jordan Motor Car Co. to manufacture a new type of car, and distribute along new lines, is proposed in a letter to Jordan stockholders from Edward S. Jordan, president of the company.

The reorganization offer is being made by Jordan Motors Corp., an Ohio corporation, and is contingent upon acceptance by two-thirds of Jordan stockholders of the new plan. Exchange of stock between the old and the new corporation would be on the basis of five shares of the new no par common stock for one share of old Jordan preferred and one share of the new common for each 10 of the old.

The 150,000 shares of the new stock remaining after the contemplated exchange would be sold at not less than \$10 each, according to the terms of the offer.

Stockholders of the present Jordan Motor Car Co. are allowed 15 days in which to accept the offer. The Jordan Motors Corp. is headed by G. L. White, president, and C. Stirling Smith as secretary and treasurer. Neither of the latter appear among the officers of the Jordan Motor Car Co. In the letter from Mr. Jordan accompanying the offer, the stockholders are informed that he will remain as president of the new organization.

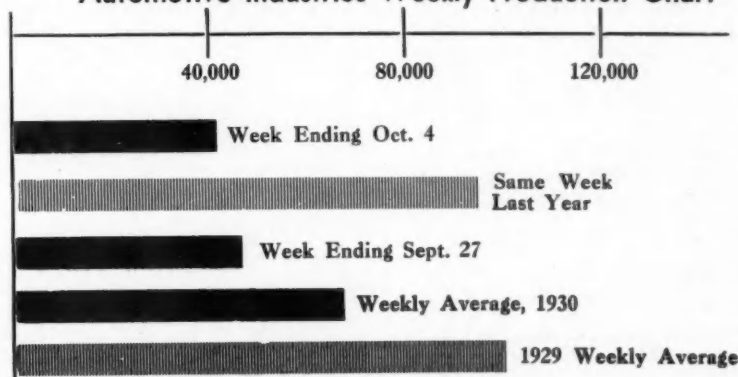
Three Companies Declare

NEW YORK, Oct. 8—General Tire & Rubber Co. has declared regular quarterly dividend of \$1 payable Oct. 31 to holders of record Oct. 20.

Handley-Page, Ltd., has declared a 5 per cent dividend on American depository receipts for participating preferred stock, payable Oct. 21 to holders of record Oct. 2.

National Battery Co. has declared regular quarterly dividend of 65 cents payable Oct. 1 to holders of record Sept. 17.

Automotive Industries Weekly Production Chart



Men of the Industry

Hudson Appoints Tracy

William R. Tracy, former vice-president in charge of sales of the Oakland Motor Car Co., has been appointed sales manager in charge of all domestic sales activities of the Hudson Motor Car Co., according to an announcement Oct. 7, by Courtney Johnson, general sales manager. Mr. Tracy resigned his post with Oakland in April after 19 years of service with that company. Through his many years' connection with automobile merchandising he is one of the industry's best known sales executives. His new connection with the sales of Hudson-Essex cars marks the continuance of his sales efforts in the field in which he has long been a prominent figure.

Oakland Names Schlecht

L. G. Peed, general sales manager, De Soto Motor Corp., has announced the appointment of G. F. Schlecht to the position of district manager at Dallas, Tex. Prior to his appointment Mr. Schlecht had been district manager in Memphis, Tenn.

Imm Joins Arrow

Louis Imm, former production manager for the Kari-Keen Aircraft Co., has joined the Arrow Aircraft & Motors Corp. engineering department. He will be assistant to James Ward, Jr., production manager.

H. B. Dixon Dies

PHILADELPHIA, Oct. 6—H. B. Dixon, formerly professor of chemistry at Victoria University, Manchester, England, who was well-known to internal combustion engine specialists throughout the world through his researches on gaseous explosions, died on September 18 last, while on a journey. Professor Dixon was 78 years old. In 1886 he succeeded Henry Roscoe, co-author of a very popular work on chemistry, as professor of chemistry at Owens College, Manchester.

Canadian Motorists Meet

VANCOUVER, B. C., Oct. 5—Growing membership in the Canadian Automobile Association was reported by delegates from all parts of the Dominion gathered here today for the start of a three-day annual convention. More than 1,200,000 motorists in all Canada's provinces are represented by the delegates.

Ontario Revenue Gains

TORONTO, ONT., Oct. 6—Estimates show that the tax on gasoline will net the Ontario Government about \$10,000,000 this year. The increase of from three to five cents a gallon

tax came into effect in March, 1929, and through the higher tax and an increase of nearly 5 per cent in sales, the revenue to the province will be increased nearly \$2,000,000 for the fiscal year which ends this month.

Louisville Sales Decrease

LOUISVILLE, Oct. 6—New car sales in Louisville for the month of September showed a decline of 39.5 per cent as compared with September of last year, and a decline of 32.9 per cent for the first nine months of the year. Sales were 478 cars, as against 791 last year; and sales for the year are 5594 as against 8545 last year.

Used car sales in Louisville, as reported in a bulletin of the Louisville Automobile Dealers Association to members on Oct. 1, show September sales of 478 cars, a decrease of 39.5 per cent as compared with 791 cars sold the same month of last year. For the first nine months of the year a total of 5594 cars have been sold, a decline of 32.9 per cent as compared with 8545 cars sold the same period of last year.

Massey Plant Steps Up

RACINE, WIS., Oct. 6—The local plant of the Massey-Harris Co., Ltd., which formerly was the J. I. Case Plow Works, and is engaged principally in manufacturing tractors, has stepped up operations to nearly 100 per cent of capacity, with 1000 on the payroll. Production is well absorbed by dealers and for building up stock. The Massey-Harris plant at Toronto has resumed operations after being practically closed for some time for inventory and repairs. The plant at Batavia, N. Y., has also been reopened.

Increases Gasoline Duty

WASHINGTON, Oct. 9—Effective Oct. 1, the Federated Malay States increased the import duty on gasoline from 15 cents to 25 cents per Imperial gallon and reduced the duty on lubricating oil from 10 cents to 5 cents per Imperial gallon, according to a cable to the Department of Commerce from Trade Commissioner Don C. Bliss, Singapore. The Straits Settlements dollar used in the Federated Malay States is at par equal to 56 cents United States currency.

Will Close for Inventory

EVANSVILLE, IND., Oct. 6—Local plants of the Graham-Paige Body Corp., body-building subsidiary of Graham-Paige Motors, will close on Oct. 15 for a 15-day inventory taking period, J. W. Evans, factory manager, announced today.

Firmer Steel Market Meets Resistance

Automotive Consumers Shift Commitments

NEW YORK, Oct. 9—With many motor car manufacturers gravitating toward lower selling prices for their finished units as a means of quickening buying, attempts on the part of steel sellers to trim the ragged edges of the market and to put prices on a more satisfactory basis meet with stiff resistance from automotive consumers.

The market for heavy rolled steel bars, shapes and plates is a shade firmer with the Pittsburgh quotation 1.65 cents, but this is largely nominal because most of the representative consumers have their needs for some time to come covered by lower-price contracts while others had protection extended to them to enable them to come in under the wire.

In the sheet and strip-steel markets efforts to lift prices or rather to eliminate concessions proceed along orthodox lines. Producers of semi-finished steel have let it be understood that they would hereafter look upon the \$31 quotation as an actual selling price rather than as the base for concessions which it has heretofore been. Asking prices for black, blue annealed, as well as full-finished automobile sheets, are in many instances \$1 or \$2 a ton higher than what they were a few weeks ago, but mills have so many lower-price commitments outstanding that even though here and there a transaction at the asking price is noted, the market's picture as a whole remains unchanged. A good deal of steel continues to be bought for immediate shipment.

Shrinkage in the releases of one of the low-priced passenger car manufacturers is made up for in part by slightly heavier releases from others. Chicago district sheet mills appear to be operating at a slightly better rate than those in the Pittsburgh, Youngstown and Cleveland sector. Enhanced production facilities in the Detroit area are looked for to be more impressively reflected from now on in the sheet market's picture.

Pig Iron—The Michigan market remains unchanged at \$18, but prices as low as \$16.50 have cropped out at other Middle West points. Automotive foundries for the most part are buying strictly against their current requirements, and low prices have in no way quickened demand.

Aluminum—News from London is to the effect that the European Aluminum Association is considering lowering prices. These reports have it that the German government is backing up demands for lower prices so as to discourage shipments of American metal into Germany. The market here is very quiet and unchanged.

Copper—More extensive curtailment of output is being talked of. The market is firmer, quite a few consumers having picked up metal at prevailing bargain prices.

Tin—Dull. At the week's opening, Straits was quoted at 28 cents.

Lead—At the beginning of the week the leading interest quoted prompt metal at 5½ cents, New York, the lowest price for the year.

Zinc—Quiet and steady.

August Exports Gain in Number

Value Also Increases Over July Figures

WASHINGTON, Oct. 6—August passenger car shipments were 1.6 per cent in number and 3.9 per cent in value above July while trucks showed a 30.1 per cent gain in number and 27.9 per cent higher valuation, according to the Automotive Division, Department of Commerce.

The valuation of all automotive products exported during August amounted to \$18,559,116, a slight reduction from the previous month's total of \$18,977,189. That this variation was so small is accounted for by an improvement in our passenger car and truck shipments, especially of the latter, while the demand for parts, accessories and servicing appliances fell below the July figure. Thus we find that August car and truck exports had a value of \$9,509,700, as against \$8,482,881 the previous month, while the miscellaneous products were worth \$9,049,416 as compared with \$10,494,308 in July.

The eight months total is recorded as \$233,636,576, which represents a drop of 46.9 per cent from the \$440,058,995 for the January-August period of 1929. Average exports for the first eight months of the year 1927-1930 are as follows: \$35,994,518; \$44,653,333; \$55,007,374, and \$29,204,572 respectively.

German Cartel Dissolved

WASHINGTON, Oct. 7—The German gasoline cartel was dissolved on Sept. 27, as the result of independents quoting lower prices on oil imported from America, Russia and Rumania, according to a cablegram received in the Department of Commerce from American Commercial Attache H. Lawrence Groves.

The retail price of tank stations in Berlin on Sept. 29 was 34 pfennigs per liter, a drop of from 1 to 2 pfennigs per liter, according to German trade information.

Cites Car Sales Drop

TOLEDO, Oct. 6—It was the slump in demand for automobiles, not the slump in the stock market, that brought about the business recession of the last few months, according to Prof. C. S. Dunford, of the department of business administration of Michigan State College, East Lansing, in his report to the Great Lakes Regional Advisory board as chairman of its committee on transportation research.

"It is now conceded that the slump in the consumer demand for automobiles preceded by several months the decline in the price of securities," Professor Dunford said.

Somber Colors Prevail on Cars In Twenty-Fourth Paris Salon

By P. H. Chase, Duco Information Service

PARIS, Oct. 4 (*by cable*)—The twenty-fourth Paris Automobile Salon, in session here, shows that somber colors prevail as the most popular finish. The majority of the cars are in black or very dark shades. The other colors in the order of their importance are brown, blue, green, gray and maroon. Red and yellow are represented on a small number of cars, yellow appearing chiefly on the larger type of automobiles and red on the smaller. There is a marked absence of freak shades.

The Salon shows that French manufacturers and color experts have copied the American lead in the use of what might be called composite colors.

In the minority of cars which are finished in brighter colors, very light shades are employed, as a rule. This is especially noticeable in the blues, grays and maroons.

Schemes of decoration of the cars differ little from those of last year and keep to sober lines, but there is great refinement of detail. Rare woods are used widely. Chromium metal is much in vogue. Colored fenders remain popular especially with coach builders. The proportion of black to colored fenders on European cars is about two to one. American cars are showing a proportion of black to colored fenders of about five to four. Automobile trunks show an increasing luxury and size.

A survey of the upholstery material shown on the cars at the Salon

discloses the continued popularity of plain broadcloth, especially for the more expensive cars. Apart from the classical fawn shades, this material at the present Salon is also found in the most brilliant shades.

Next in importance in upholstery comes the fancy cloth materials, showing small patterns in various shades. Geometrical designs are not so prevalent this year. Several cars on display showing brown designs which give a tweed effect.

Pile materials show a decided advance over last year, due to the fact that last year this class of material was shown mostly on imported cars, while this year it is used generally on French cars. Bedford materials show a distinct falling off.

Percentages of cloth materials, not including rayon, shown as upholstery are approximately as follows: plain cloth, fifty-two per cent; fancy cloth, thirty per cent; pile materials, thirteen per cent; Bedford, five per cent. Leather and lacquered fabrics represent about nineteen per cent of the total. In these latter materials there are several examples showing reptile grain. An interesting feature was the increase in cars upholstered in rayon or a combination of rayon and other materials as compared to the use of this material last year.

Several French and German cars, two American cars and a leading English car show rayon upholstery or rayon in combination with other materials.

Gasoline Sales Jump

QUEBEC, Oct. 6—Gasoline sales in the Province of Quebec jumped nearly 25 per cent during the course of the fiscal year of 1929-30. During the 12 months ending July 1, 1930, the total amount of gasoline purchased was 81,000,000 gal., as compared with 66,000,000 gal. purchased during the previous year. In 1928-29, 62,000,000 gal. were consumed by machines, the remaining 4,000,000 gal. being used for industrial and other purposes exempt from taxation. Last year, out of the 81,000,000 gal., only 5,000,000 gal. were exempt from taxation, the remaining 76,000,000 gal. being subject to tax of 5 cents per gal., which means that gasoline contributed the sum of \$3,800,000 to the provincial coffers.

Iowa Collections Rise

DES MOINES, IOWA, Oct. 6—September gas tax collections in Iowa netted \$1,128,408.62, surpassing the million-dollar mark for the fourth month this year, bringing the total for the nine-month period to \$8,821,876.62. Comparisons with last year indicate that the total for the year will pass

\$12,000,000, according to Ray E. Johnson, state treasurer. Estimates upon basis of the tax collected indicate that Iowans purchased 288,986,803 gal. of gas.

Building Plant Addition

CEDAR RAPIDS, IOWA, Oct. 6—Work has been started upon an assembly plant, 205 x 60 ft., costing \$21,000, for the Iowa Mfg. Company, 924 Sixteenth St., northeast. The new unit will connect the older factory with the office building and is scheduled to be completed by Nov. 10, according to Howard Hall, president of the company, which manufactures road machinery.

Sees Prosperity Ahead

DETROIT, Oct. 8—Economic conditions are ripe for prosperity and it requires no return of confidence on the part of the public to make it an established fact, John N. Stalker, president of the Union Guardian Trust Co., told a group of some 400 dealers and salesmen at a meeting here last night sponsored by the Detroit Auto Dealers Association.

New Army Unit Unites All Branches

Motorized Equipment For Experimental Set-up

WASHINGTON, Oct. 9—The largest mechanized force ever assembled by the United States army will be formed at Fort Eustis, Va., when about 600 officers and enlisted men and 100 motor vehicles of all kinds will be used in special maneuver work under command of Col. Daniel Van Voorhis, a well-known cavalry officer, and his executive officer, Maj. Sereno E. Brett, an infantry tank expert.

The force will be permanent in character and will be used as an experimental laboratory. It will test the present types of motor vehicles in use in the army, report upon their advantages and disadvantages, make recommendations for their improvement, test such new vehicles as may be developed, and formulate the tactics and strategy necessary to the maneuvering, marching and fighting of such a unit.

The force will consist of the following units: Headquarters section; signal platoon; Co. A, First tank regiment; Battery A, Sixth field artillery; Nineteenth ordnance company; Co. C, Thirteenth engineers; Troop A, second armored car squadron; chemical warfare detachment; anti-aircraft detachment, and Co. H, Thirty-fourth infantry (machine gun).

Illinois Collections Increase

SPRINGFIELD, ILL., Oct. 4—Illinois' current gas tax has netted the state \$27,640,604.98 in the first year of operation, representing collection upon 940,156,600 gal. of gasoline, a gross of \$28,204,698.74. Deductions for collection allowance of two per cent and refund of \$565,128.25 accounted for the curtailment from the gross collection reported. July with sales of 97,647,000 gal. netting \$2,870,822 was banner month of the year. Two-thirds of the money collected went into the state road fund and the remainder was distributed to counties for local programs.

Kissel Named Defendant

MILWAUKEE, Oct. 6—Kissel Motor Car Co., Hartford, Wis., recently placed in receivership, an action to foreclose a \$750,000 trust mortgage, has been made defendant in a suit for the recovery of loans amounting to \$250,000 by the Small Issues Corp., New York.

Gasoline Revenue Rises

NASHVILLE, TENN., Oct. 6—Charles M. McCabe, commissioner of finance and taxation, reports that the tax on gasoline amounted to \$1,063,231.64 for the month of September. This is an increase of \$68,284.02 over September, 1929, Mr. McCabe said.

Chrysler Opens Salon

DETROIT, Oct. 6—A permanent salon of Chrysler Imperial Eights will be maintained at the John H. Thompson Co. showroom, 3164 E. Jefferson Ave., it was announced today. George Zuvor has been named Imperial sales manager and with his staff will work under supervision of J. E. Bayne, retail sales manager for the Thompson company.

Logan Has New Axle

TOLEDO, Oct. 7—The Logan Gear Co. has developed a new type of tubular axle for use in building of automobiles and has secured contracts from two makers, it has been announced here.

The company is now expanding its facilities by investment of about \$150,000 in the equipping of its plant for this special line of manufacture. About 75 workmen will be added to its payrolls in the new departments, bringing total now at work to more than 550 employees. C. O. Miniger is chairman of the board of the company and J. B. Nordholt is president and general manager.

On Joint Show Committee

NEW YORK, Oct. 7—Arrangements for the joint trade show of the Motor and Equipment Association and the National Standard Parts Association are being perfected by a joint committee consisting of the following: M. C. Dewitt, chairman of the M. E. A. show committee; L. F. Iverson, chairman of the N. S. P. A. show committee; E. T. Satchell, M. E. A. jobber; V. C. Anderson, N. S. P. A. jobber; B. W. Ruark, executive secretary M. E. A. Divisions "B" and "C"; and R. Macfee, secretary of the N. S. P. A.

Gleaner Reports Assets

CHICAGO, Oct. 6—The balance sheet of the Gleaner Combine Harvester Corp. as of Aug. 31, 1930, shows current assets of \$5,399,113 and current liabilities of \$2,529,259, as compared with \$3,600,996 and \$1,129,319 respectively, as of Aug. 15, 1929. S. H. Hale, chairman of the board, has written stockholders that he expects the coming year will exceed past earnings records.

Chicago Revenue Gains

CHICAGO, Oct. 6—Vehicle tax collections for the first nine months of 1930, totaling \$5,238,094, exceed by \$27,280 the revenue for the same period of 1929, City Collector Morris Eller announced yesterday. A total of 463,646 passenger cars and trucks bear city licenses.

Iowa Completes Paving Project

AMES, IOWA, Oct. 6—Iowa's goal of 1000 miles of paved highways constructed in 1930 was attained the first of this month and the state's total paved highways by the end of the year will be nearly 3350 miles.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Oct. 8—The outstanding trade development last week was the more seasonable weather, which substantially aided the wholesale and jobbing lines. There was a strong tendency toward improvement in the prices of agricultural commodities. Wheat advanced from 3 to 4 cents; corn from 5 to 6 cents; oats from 3 to 3½ cents, and rye from 4 to 4½ cents. The low prices in many branches of trade stimulated demand, and it is reported that stocks in some lines are in need of replenishment. It is generally reported that business during September was somewhat better than that during August, but below that a year ago.

MAIL ORDER SALES

Sales of one large mail order house during September were 18.35 per cent below those in the corresponding period last year, while sales during the first nine months of this year were 1.3 per cent below those in the corresponding period last year.

LUMBER ORDERS

Lumber orders during the week ended Sept. 27, according to reports from 885 leading hardwood and softwood lumber mills, were 5 per cent above production, while shipments were 8 per cent above production.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended Sept. 27 amounted to 2,389,750 barrels, as against 2,421,800 barrels for the preceding week and 2,900,400 barrels a year ago.

DEPARTMENT STORE SALES

Department store sales during August in the United States, according to the Federal Reserve Board, were 12 per cent below those a year ago.

CAR LOADINGS

Railway freight loadings for the week ended September 20 totaled 952,512 cars, which marks a decrease of 214,883 cars below those a year ago and a decrease of 191,619 cars below those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Oct. 4 stood at 82.3, as against 83.1 the week before and 83.6 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Oct. 1 were 23 per cent below those in the corresponding period last year.

STOCK MARKET

The stock market last week suffered another bad break, with large declines all around.

Financial Notes

American Machine & Foundry Co. has declared an initial quarterly dividend of 35 cents and an extra dividend of five cents, both payable Nov. 1 to holders of record Oct. 17, together with a second extra dividend of 20 cents payable Dec. 1 to holders of record Nov. 15.

Fafnir Bearing Co. has declared regular quarterly dividend of \$1 payable Sept. 30 to holders of record Sept. 25.

General Aviation Corp. of America has declared regular quarterly dividend of 43½ cents on preferred payable Oct. 15 to holders of record Oct. 3.

Triplex Safety Glass Co. has declared a 5 per cent ordinary stock dividend on American Depository Receipts payable Oct. 21 to holders of record Sept. 30.

Studebaker Shares Listed

CHICAGO, Oct. 6—Directors of the Chicago Board of Trade have approved the listing of Studebaker Corporation shares on the securities market. The listing consists of 67,500 shares of cumulative preferred and 2,031,617 shares of common stock. These stocks were removed from the Chicago Stock Exchange list Wednesday.

Case Has New Tractor

CHICAGO, Oct. 6—J. I. Case Company has announced its new tractor Model C, a general purpose tractor offering the new feature of variable wheel spacing. The rear wheels can be set out from the standard 48 in. tread for plowing purposes to various treads up to 84 in. for row crop planting, cultivating and other work. Commercial production of these tractors, which will retail for about \$1,000, began earlier this year, but no general announcement was made until recently. Officials declined to state how many were made this year or to estimate how many will be put out next year.

Wins on Midwest Track

CHICAGO, Oct. 6—H. M. Lewis, of Chicago, driving an Oakland, won the annual 100-mile Midwest dirt track championship race yesterday at Roby Speedway. J. Bisak, another Chicago driver, finished second with an Oldsmobile. Third place went to John Adams, who drove a Chevrolet, and Bob Cleveland got in the money with a Ford. Despite retiring to replenish his fuel supply, Lewis set a new western track record. His time of 93:26 4-5 bettered the old mark of 97:15 2-5. A new lap record was established by Luther Johnson with a time of 54 2-5 seconds.

Dodge Truck Sales Up

DETROIT, Oct. 6—W. S. Graves, director of truck sales, Dodge Brothers Corp., has announced that truck deliveries to dealers in September exceeded the combined July and August deliveries, and that immediately following the announcement of the new line last month production schedules were increased 60 per cent and have been raised repeatedly since.

Marmon Shipments Gain

INDIANAPOLIS, Oct. 6—Shipments of new cars by the Marmon Motor Car Co. were greater during the month of September than during the same month of last year, according to an announcement from the factory. Shipments during the month exceeded by 19 per cent combined shipments for July and August, according to the announcement.

Wins Ford Air Trophy

DETROIT, Oct. 6—The National Air Tour sponsored by Edsel B. Ford, which ended here Sept. 27, was won by Harry L. Russell, piloting a Ford Tri-motor plane with a score of 58,575.6 points, among a field of 18 contestants.

John Livingston took second place with a Waco, scoring 55,628.2 points, winning over the Waco piloted by Arthur Davis whose score was 55,226.0. M. E. Zeller took fourth place with a Ford Tri-motor, scoring 55,016.2 points.

The rest of the first ten contestants taking prizes follow in order of their arrival: George Haldeman, Bellanca; W. H. Beech, Curtiss Kingbird; J. W. Smith, Bellanca; Eddie Schneider, Cessna; T. Z. Wadlow, Travel Air, and Leslie Bowman, Waco.

To Make Guayule Rubber

SAN FRANCISCO, Oct. 6—Construction has begun on a \$150,000 plant just south of Salinas to manufacture rubber. It will be made from guayule plants now growing on 25,000 acres of land near Salinas, operated by American Rubber Producers, Inc., a subsidiary of the Intercontinental Rubber Company.

Dr. William B. McCallum, botanist for the company, has conducted experiments over a long period in finding a soil which would reproduce this Mexican rubber plant. It is stated the plants will yield 1000 pounds of rubber in four years.

Alloys Committee Formed

NEW YORK, Oct. 7—The Engineering Foundation has organized the Iron Alloys Committee under the chairmanship of Dr. George B. Waterhouse, professor of metallurgy in Massachusetts Institute of Technology, to summarize all available information in the field of iron alloys. The foundation has appropriated \$230,000 to make possible a review of all available literature on the subject.

Hupp Signs 34 Dealers

DETROIT, Oct. 6—Thirty-four new dealers and two distributors signed the Hupmobile franchise during September, according to Hupp Motor Car Corp. In Portland, Oregon, Dulmage Motors took over distribution of Hupmobiles, while the Century Motor Co. is the new distributor in Saint John, New Brunswick.

Few New Models At Paris Salon

Stainless Steel Slow in Being Adopted on Cars

(Continued from page 527)

and controlled by means of a friction clutch; it also has three oil pumps, Bosch magneto-battery ignition with both distributors mounted on the magneto; central chassis lubrication; a three-speed transmission with Maybach mechanical overdrive operated by vacuum, and vacuum servo brakes.

Maybach shows a 427 cu. in. Zepelin-type engine in a chassis having a three-speed transmission and an overdrive gear. This is a twelve-cylinder V type. Another twelve-cylinder V engine, of 366 cu. in. displacement, is shown by Tatra on a tubular backbone chassis, having four independently sprung wheels. Austro-Daimler also shows a chassis with tubular backbone and independently sprung rear wheels, the front-end construction being conventional. This chassis is fitted with a straight-eight aluminum engine of 282 cu. in. displacement, having dry-sump lubrication, all oil being contained in a tank cast integral with the dash. The third speed is a direct drive, the fourth being geared up 25 per cent. The German Roehr firm is showing a straight eight with four independently sprung wheels.

Increased use is made of nitralloy steel in many parts of engines and chassis, but its use for cylinder liners has not increased, Hispano and Balbot being the only firms so using it. The French Balbot firm abandoned nitralloy liners on account of trouble with pistons, but is using it for crankshafts. Aries has produced a sports model with nitralloy crankshaft and forged duralumin connecting rods, which latter bear directly on the hardened crankpins, no bearing-metal liners or bushings being used.

No fabric bodies are being shown, and there are no open cars in the exhibition except pure sports models. The Viscaya frameless, all-metal body, which is produced in sections that are bolted together with rubber liners between, is meeting with considerable success. It is stated that Durant will produce this body in the United States. Four-window sedans are preferred to the six-window type. There is a tendency to increase the width of the bodies to equal the wheel track, to abolish running-boards, and to fit fore and aft bumpers on both sides.

Two shades of the same color or strongly contrasting colors are a favorite color combination. Few or no moldings are being used, and the doors are brought down to the running-boards without break, or the valance is made flush with the doors to present an unbroken line extending from the roof to the running-board. Chromium finish is very general, but stainless steel is not much in evidence.

Wayne County Sales Increase

Ford Registrations Near
50 Per Cent of Total

DETROIT, Oct. 6—New passenger car registrations in Wayne county during September totaled 3281, an increase of 72 or 2 per cent over the total of 3209 in August, and a decrease of 3794 or more than 53 per cent from the total of 7075 in September, 1929. The total registrations to date are 56,538 as compared with 104,304 for the same period last year.

Ford passenger car registrations last month totaled 1649 or about 50 per cent of the total of all makes in the county. Chevrolet showed a total of 389 while Buick ranked third with 259 and Cadillac fourth with 95.

Commercial vehicle registrations for the county last month totaled 487 as compared with 220 in August and with 948 in September, 1929. Ford was first on the list with 349 and Chevrolet second with 74. Total commercial vehicles registered to date was 4319 as compared with 4565 for the same period last year.

Petroleum Institute to Meet

NEW YORK, Oct. 7—American Petroleum Institute will hold its eleventh annual meeting at the Stevens Hotel, Chicago, Nov. 10 to 13, inclusive. Subjects for discussion include: Disposal of waste, fire prevention, transportation, standardization, safety, hydrogenation, research, motor fuels, unitization, drilling and production practice, marketing code, public relations, statistics, conservation, refinery engineering, accounting, methods, tests, specifications, proration, corrosion, pipe lines, marketing problems, uniform measurements, etc.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

London, England, Olympia Show...October
Dallas, Southwestern Automobile, Oct. 11-26
National Roadbuilders' Show and Convention, St. LouisJan. 10-16
International Garage Exposition, Berlin, GermanyMay 9-Aug. 9
New York, National Automobile...Jan. 3-10
Chicago, National Automobile...Jan. 24-31

CONVENTIONS

Sixth International Road Congress, Washington, D. C.Oct. 6-11
Exhibition—American Roadbuilders Association, Washington, D. C., Oct. 6-11
A. S. M. E. General Meeting, French Lick SpringsOct. 13-15
Society of Industrial Engineers, Washington, D. C.Oct. 15-17
Society of Automotive Engineers, Transportation, Pittsburgh...Oct. 22-24
Motor and Equipment Association, Convention, ClevelandNov. 10-14
N.S.P.A. Convention, Cleveland, Ohio, Nov. 17-21
Annual Asphalt Paving Conference, Memphis, Tenn.Dec. 1-5
First International Aerial Safety Congress, Paris, FranceDec. 10-23
Society of Automotive Engineers, Annual Dinner, New YorkJan. 8
Society of Automotive Engineers, Annual Meeting, Detroit ...Jan. 19-23
Society for Steel Treating (National Western Metal and Machinery Exposition), San Francisco...Feb. 16-20

SALONS

Chicago, Drake HotelNov. 8-15
New York, Commodore Hotel, Nov. 30-Dec. 6
Paris, FranceOct. 2-12
Prague, CzechoslovakiaOctober
Paris, France, Salon (Commercial Vehicles)Nov. 13-23
Brussels, Belgium, SalonDec. 6-17

Has Outboard Engine Session

Milwaukee Section
Hears Irgens and Webb

MILWAUKEE, Oct. 6—The October meeting of the Milwaukee Section, S. A. E., was devoted to outboard engines, discussions being led by F. T. Irgens, chief engineer, and W. J. Webb, sales manager of Outboard Motors, Inc., Milwaukee, the recent consolidation of Evinrude and Elto, Milwaukee, and Lockwood, Jackson, Mich. It was brought out that in the last five years outboard motoring has grown faster than any other division of the automotive industries, and Milwaukee is to the outboard industry what Detroit is to the automobile.

In ten years boat speeds have increased from 5 miles to 50 miles per hour; engineers in five years have increased the power of their engines five times without increasing the displacement and are getting 1 hp. per cubic inch out of the motors.

Five years of outboard development has made 4000 r.p.m. propellers practical, when for a half century 1000 r.p.m. was considered about the highest efficient propeller speed.

I. H. C. Buys New Land

CHICAGO, Oct. 4—Provision for future expansion of its facilities is being made by the International Harvester Company through the assembling of a large tract of land at 106th St. and Muskegon Ave., directly north of its present plant. The property is near the Wisconsin Steel works, a subsidiary, and the purchase price is said to have been \$63,408. The entire tract is 460 ft. by 560 ft. and is of irregular shape. The company said no immediate plans were under consideration.

STATEMENT OF OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AUTOMOTIVE INDUSTRIES, published weekly at Philadelphia, Pa., for October 1, 1930

STATE OF PENNSYLVANIA) ss.
COUNTY OF PHILADELPHIA)

Before me, a Notary Public in and for the STATE and county aforesaid, personally appeared C. A. Musselman, who, having been duly sworn according to law, deposes and says that he is the Business Manager of AUTOMOTIVE INDUSTRIES, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publishers, editor, managing editor and business manager are: Publishers, Chilton Press Company, Chestnut and 56th Sts., Philadelphia, Pa.; Editor, Leslie Peat, B-305 Bourne Court, 48th & Pine Sts., Philadelphia, Pa.; Directing Editor, Norman G. Shidle, Walnut Park Plaza, 63rd & Walnut Sts., Philadelphia, Pa.; Business Manager, C. A. Musselman, Merion, Pa.

2. That the owners are: (Give names and addresses of individual owners or if a corporation, give its name and names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): United Publishers Corporation, 239 West 39th St., New York, N. Y.

United Publishers Corp. Stockholders in excess of 1%

A. United Business Publishers, Inc., 239 W. 39th St., N. Y. C. (see note)

B. Frederic C. Stevens Co., 23 Prospect Terrace, Montclair, N. J. (see note)

Note—Stockholders of (A) in excess of 1%
UNITED BUSINESS PUBLISHERS, Inc.

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George H. Buzby, Wellington Apts., 19th & Walnut Sts., Philadelphia, Pa.

Anna B. Frank, Pleasantville, N. Y.
Fritz J. Frank, Pleasantville, N. Y.
Lee, Higginson & Co. (Partnership), New York, N. Y.

C. A. Musselman, Merion, Pa.
A. C. Pearson, Montclair, N. J.
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Frederic C. Stevens, 325 West End Ave., New York, N. Y.
Ruth S. Kane, Montclair, N. J.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him. C. A. MUSSELMAN.

Sworn to and subscribed before me this 1st day of October, 1930.

(Seal) JOHN A. CLEMENTS.

Commission Expires at the end of the next session of the Senate.